TROPICAL DISEASES BUREAU.

# TROPICAL DISEASES BULLETIN.

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## SLEEPING SICKNESS.

HECKENROTH (F.). **La Trypanosomiase humaine au Sénégal.**—*Bull. Soc. Path. Exot.* 1916. Nov. Vol. 9. No. 9. pp. 723–731.

In Senegal during 1915 and the first seven months of 1916, 184 fresh cases of sleeping sickness have been put on treatment; of these 99 were men, 39 women and 46 children. In a table indicating the locality in which infection was contracted it is shown that 161 cases originated in the Petite Côte.

After the work of the Sleeping Sickness Commission to Senegal of 1908* the administration saw the necessity of a campaign against human trypanosomiasis. This appeared easy as the area infected was well defined and of relatively little extent. The village of Sors, near St. Louis, became the centre at which all cases of trypanosomiasis were to be treated. From June 1908 to December 1909 there were 58 entries but during the following years the numbers fell successively to 44, 37 and 22, until at the beginning of 1913 there were at Sors no more than eight patients. Cases of sleeping sickness amongst the native population continued to be numerous, but these escaped the vigilance of the administration, thanks to the complicity of the chiefs who considered internment of the sick at Sors to be a vexatious measure.

It was then that the present Commission was established by the Governor General with a view to examining the state of sleeping sickness in the Colony. As mentioned above in 19 months (1915–1916) 184 cases were found whereas in 1908–9 only 58 cases were admitted to Sors. Heckenroth then makes certain recommendations regarding the general method of dealing with the disease.

From observation of the cases encountered three points only called for special attention.

1. The slowness with which the disease develops in Senegal. Patients seen after one, two and even three years of sickness do not appear more ill than the natives of French Equatorial Africa after six months or one year. Sleeping sickness patients in Senegal who remained either untreated or insufficiently treated did not seem distinctly worse when seen again some weeks later, while in the Congo it was constantly observed that the condition of such cases was aggravated.

* See *Sleeping Sickness Bulletin*, Vol. 3, pp. 201–6.

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2. The blood of 138 patients who contracted the infection in the Petite Côte (Senegal) was examined for trypanosomes ; parasites were found 11 times by direct examination of a drop of blood and 95 times after centrifugation of 10 cc. of blood in those cases in which direct examination was negative. On 21 occasions the centrifugation method was negative and in 11 cases it was not performed. Thus in only 7·9 per cent. of cases were trypanosomes found in the peripheral blood by direct examination. This figure is far behind that obtained by the author in the Congo (32 per cent.), and by Martin, Leboeuf and Roubaud in Equatorial Africa (37 per cent.). Thiroux, Wurtz and Teppaz however failed to find the parasites in the peripheral blood by direct examination in 40 Senegal cases. In the 11 cases in which trypanosomes were found by direct examination of the blood they were scanty in six and present in fair numbers in the remainder.

3. Lafont and Dupont noted the presence of albumen in the urine of 80 per cent. of trypanosomiasis cases in Senegal. Heckenroth had never seen this in sleeping sickness cases in the Congo, but amongst 117 cases in which the urine was examined in the Petite Côte albuminuria was noted 33 times. The author considers however that this is not a symptom of trypanosomiasis but of some intercurrent disease, notably bilharziasis. Eggs were found in 20 of these cases and in almost all there was on centrifugation of the urine a deposit of red cells.

The slower evolution of sleeping sickness in Senegal than in the Congo and the rareness of the parasites in the peripheral blood seem to indicate that the virus of Senegal, which appears specifically identical with that of the Congo, has undergone an attenuation of virulence, the explanation of which must perhaps be sought in the different conditions of life of the tsetse-fly of the Congo—a wet country—and of those of Senegal—a dry country.

W. Yorke.

Maynard (G. D.). **The Trypanosomes of Sleeping Sickness ; being a Study of the Grounds for the Alleged Identity of *T. brucei* with those causing Disease in Man in Nyasaland.**—*S. African Inst. Med. Res.* (No. VI). 1915. Dec. 17. 39 pp. With 26 charts. Johannesburg : Published by the Institute. [Price 5*s.*]

This paper is concerned mainly with a critical analysis of the various biometric curves of *T. brucei* and human strains of trypanosomes which have been constructed by the Royal Society's Commission to Nyasaland and others.

Amongst the author's conclusions are the following :—

Analysis of length distributions shows that the dimorphic trypanosomes *T. rhodesiense*, *T. brucei*, *T. gambiense*, trypanosomes of Nyasaland sleeping sickness and Nyasaland wild game strain have certain features in common. With some exceptions, which are not confined to any particular strain, the general character of resolution is similar. There appears to be less similarity between the Nyasaland human strain and *T. brucei* than between *T. rhodesiense* (Stephens and Fantham) and *T. gambiense* as recorded by these authors.

Analysis suggests that uniformity in treatment of strains, prior to inoculation of rats, from which measurements are made, may be an important factor in determining the mean size and the variability of the

components of the distributions. At the present no valid argument in regard to the identity or otherwise of *T. brucei* and the trypanosome causing disease in man in Nyasaland can be drawn from length-measurement and distributions. This method of investigation may probably prove of service in the study of trypanosome species when proper analytical methods are employed at the time the investigations are being undertaken, but nothing of value can be expected from an uncritical examination, or mere inspection, of the crude distributions.

At present the only valid argument in favour of the identity of the trypanosome causing disease in man in Nyasaland with *T. brucei* is to be drawn from experiments in regard to their pathogenicity for animals. There is some doubt, however, as to what weight should be attached to differences in period of illness before death, and moreover, whether any stress should be laid on similarity in this respect in the absence of confirmation by other methods of investigation.

Immunilogical experiments carried out by the Royal Society's Commission and others negative the suggestion of identity of *T. brucei*, Nyasaland human strain, Nyasaland wild *G. morsitans* strain and *T. rhodesiense*, and such serological experiments as have been undertaken negative the supposition that *T. brucei* is identical, or even closely allied, to the trypanosome causing sleeping sickness in man.

There is no evidence at present from the known geographical distribution of *T. brucei* to suggest that it is a cause of sleeping sickness in man; and even if it were found to produce disease in man this would of itself constitute no greater argument in favour of its identity with the Nyasaland strain than with *T. gambiense*.

It would appear therefore that there is very little scientific evidence to support the contention that *T. brucei* and the trypanosome causing sleeping sickness in Nyasaland are the same species, while there are some very valid reasons for regarding them as distinct.

[The author does not produce any new facts in aid of this contention. A great deal of the paper is open to criticism. The arguments in support of the identity of the trypanosome infecting man in South Central Africa and that of the same appearance found in game and wild *Glossina morsitans* have been developed by the reviewer and others in a number of papers and need not be repeated.

In a subject of such practical importance as the one under discussion one feels that the onus of proof lies with those who deny the identity of two parasites which have not yet been shown to be different, but which on the contrary exhibit more than a superficial resemblance to one another morphologically, as regards pathogenicity and also as to the manner of their development in *Glossina morsitans*.]

W. Y.

Macfie (J. W. S.). **Preliminary Note on a Monomorphic Trypanosome found in the Blood of a Native of the Gold Coast.**—*Brit. Med. Jl.* 1917. Jan. 6. pp. 12–13. With 1 chart.

The patient who was infected with the trypanosome described in this paper was a native and a member of the Gold Coast Constabulary. He was examined by Graham at Tamale and found to be suffering from trypanosomiasis. The history suggests that infection might have occurred three weeks previously. Apart from slight fever, which

Graham thought might not have been due to the trypanosomes, there were no symptoms. After a single injection of atoxyl the trypanosomes disappeared from the blood and to the time of writing had not been seen again.

Blood films were sent to Macfie, the first in September last, and a second made before the trypanosomes disappeared from the blood was sent later. Both films contained fairly numerous trypanosomes.

Even at first glance it was evident that the morphology of the parasite was unusual; it was monomorphic and very closely resembled *T. vivax*. The body showed the characteristic abrupt narrowing immediately anterior to the nucleus; the cytoplasm was relatively clear and showed an alveolar structure; the posterior end was usually blunt, and the large rounded blepharoplast was terminal or nearly so; the undulating membrane was narrow and there was always a long free flagellum; the nucleus was oval and often divided into several pieces.

A hundred trypanosomes were measured from each film and a biometric graph constructed. The maximum length was 24$\mu$, the minimum 18$\mu$, and the average 20·7$\mu$. The graph clearly indicates the monomorphic character of the parasite.

The author points out that although the morphology of the parasite very closely resembles that of *T. vivax* the result of the small number of measurements made suggests that it is a little smaller, the crest of the curve occurring at 21$\mu$ instead of at 23$\mu$. The trypanosome appears to be intermediate between *T. uniforme* and *T. vivax* as regards its morphology but further examinations must be made before any definite conclusion can be reached.

*T. vivax* was found in no less than 76 per cent. of the hump-backed cattle at Accra and it would therefore be a serious matter if this species were proved to be a pathogenic to man. As the patient has been apparently free from parasites for a long time the chances of obtaining the strain for laboratory experiments are not very great.

[Dr. Macfie has shown one of the blood films in question to the reviewer who was much impressed by the morphological similarity of the parasite to *T. vivax*. Reference might be made to the fact that Blacklock and Yorke succeeded in infecting rabbits with *T. vivax* and that in a number of these animals the infection ran a rapid and fatal course. No change in the morphology of the trypanosome was observed after passage through six rabbits [see this *Bulletin*, Vol. 3, p. 168].

W. Y.

Macfie (J. W. Scott). **Two Strains of Human Trypanosome from the Gold Coast and Northern Nigeria.**—*Report of the Accra Laboratory.* 1915. pp. 55–57. With 2 text figs. London: J. & A. Churchill.

The first of these strains came from a case of sleeping sickness in Ashanti; it was sent to the Laboratory in two monkeys (Cercopithecus) by Dr. Ingram. One of these monkeys died on the 93rd day and the other, from amoebic dysentery, on the 64th day. Five guinea-pigs and one white rat were inoculated but only two guinea-pigs became infected, one of which died on the 78th day, the other being alive and well at the time of writing. The parasite therefore does not appear to be very pathogenic. Morphologically the trypanosome was not distinguishable from *T. gambiense*.

The other strain examined was that causing sleeping sickness in the Benue River in Northern Nigeria. Blood films and smears of gland juice were sent to the author by Dr. Foy from seventeen suspected cases of sleeping sickness (2 Europeans and 15 natives). Trypanosomes were found in 14 of these (2 Europeans and 12 natives). In all cases the parasites were scanty; they were of the polymorphic type and did not exhibit the forms characteristic of *T. rhodesiense* or *T. nigeriense.*

W. Y.

Ingram (A.). **Concerning Age, Sex and Race in the Incidence of Human Trypanosomiasis.**—*Report of the Accra Laboratory.* 1915. pp. 36–44. London: J. & A. Churchill.

In this paper the author summarises the literature dealing with sex and age of individuals suffering from trypanosomiasis; he quotes at length from Todd's paper on the subject [see this *Bulletin*, Vol. 2, p. 255].

The following table, in which the figures obtained by Todd in the Congo (1903–05) and the Gambia (1911) are compared with those of Macfie and Gallagher in the Eket district of Nigeria (1912–13) and Kinghorn and Wade in Ashanti (1909–13), is of interest.

*Analysis of Cases of Trypanosomiasis seen in Ashanti in Comparison with figures for the Congo, Gambia and Eket District of Nigeria.*

| | Males. | | | Females. | | | |
|---|---|---|---|---|---|---|---|
| Age. | 0–13. % | 14–44. % | 45 and over. % | 0–11. % | 12–39. % | 40 and over. % | No. of cases. |
| Congo, 1903–05 combined cases | 6·4 | 60·2 | 1·35 | 2·3 | 29·75 | 0·0 | 348 |
| Gambia, 1911 . | 16·4 | 39·3 | 0·0 | 7·6 | 36· 7 | 0·0 | 79 |
| Eket District, 1912–13 .. | 38·7 | 23·9 | 0·4 | 17·6 | 19· 4 | 0·0 | 222 |
| Ashanti, 1909-13 | 13·1 | 48·3 | 1·6 | 2·3 | 30· 1 | 4·6 | 259 |

Other papers bearing on the subject are discussed in some detail. The conclusion is:—

"Age, sex and race incidence in human trypanosomiasis vary directly with the extent to which the individual is exposed to the bite of infective tsetse flies."

W. Y.

Bouet (G.). **Contribution à l'étude des zones à glossines du Sénégal. (Region du chemin de fer de Thiès à Kayes).**—*Bull. Soc. Path. Exot.* 1916. Dec. Vol. 9. No. 10. pp. 802–813. With 1 map.

The railway connecting Senegal with the Soudan from Thiès to Kayes has a length of about 700 km. and about 135 km. of this is through a belt of *Glossina morsitans.* The fly exists in islands which are as a rule some distance from large centres; these areas are frequented by large game, at least during certain periods of the year.

The Glossina of this region, as those of the Upper Gambia, apparently convey only *T. dimorphon*; they are free from *T. pecaudi* and *T. cazalboui*. It is to be feared that the passage of numerous herds (of zebu in particular) coming from the Soudanese country may introduce into the Thiès-Kayes district the two latter trypanosomes. Furthermore Soudanese herds free from infection may become contaminated with *T. dimorphon* whilst traversing this fly belt, but as most of the animals are destined to be slaughtered within a fortnight of their arrival at Lyndiane there would be a slight mortality only from this cause.

The completion of the railway will modify this state of affairs if care be taken to send the animals in fly proof trucks as is done on the railway in the Ivory Coast.

The population, which will migrate towards the line of the railway to cultivate ground nuts, will gradually cause the disappearance of the game and in consequence of *Glossina morsitans*.

The road from Cotiari to Ambidédi employed by the military and civil population of the Soudan during a portion of the year is to be relaid to permit of the use of motor traffic and this will be an improvement on preceding years. It is desirable that mechanical traction should be generally employed in all regions in French West Africa where trypanosomiasis and Glossina are found.

W. Y.

Bouet (G.) & Roubaud (E.). **Répartition des glossines à la Côte d'Ivoire.**—*Bull. Soc. Path. Exot.* 1917. Jan. Vol. 10. No. 1. pp. 37–39.

In 1907 Bouet published an account of the distribution of Glossina in the Ivory Coast. He observed that *G. palpalis* exists all over the Basse Côte, that *G. fusca* has nearly the same distribution but is rarer and more localised; that *G. pallicera* is found along the railway from Azaguié to Tiassalé; and that *G. morsitans* occurs at Toumodi. In the Haute Côte *G. palpalis*, *G. fusca*, *G. morsitans* and *G. tachinoides* are found. It was afterwards shown that true *G. morsitans* does not exist in the colony but a neighbouring species, *G. longipalpis*.

More recently the authors have made further observations regarding the distribution of the species of the Fusca group. True *G. fusca* was encountered in numerous localities of the Basse Côte whilst *G. nigrofusca* and *G. medicorum* were found at Azaguié on the railway.

A table is given showing the distribution of the various species of *Glossina* captured at the different stations on the railway. At Azaguié most species were found—*G. palpalis*, *G. pallicera*, *G. medicorum*, *G. fusca*, *G. nigrofusca*. From Tiemelekio (K. 162) on to Bouaké *G. longipalpis* predominated.

With regard to the zones of distribution of the various species the authors find that from the Coast to about 6° N. *G. palpalis* and the species of the Fusca group predominated; between 5° 30′ and 5° 50′ is the exclusive zone of *G. pallicera*. This appears to be equally, but in a less absolute degree, the zone of distribution of *G. medicorum* and *G. nigrofusca*. Towards 6° 20′ commences the zone of *G. longipalpis* which predominates all over the hinterland as far as 10° N. This zone together with analogous zones in the Gold Coast and Togoland forms a large belt of *G. longipalpis* midway between the coast (region of large

forests) and the Soudan. Towards 8° *G. tachinoides* appears, the zone of predominance of this fly extending over all the country behind the Ivory Coast.

From South to North there are then in the Ivory Coast four principal zones of Glossina characterized by the predominance of different species. These are—(1) the zone of *palpalis* and *fusca*, (2) the zone of *pallicera*, (3) the zone of *longipalpis*, and (4) the zone of *tachinoides*.

W. Y.

Robertson (M.). **Report upon the Present Conditions of the Siroko Valley, Mount Elgon.** Dated 21st January, 1914. [M.S. Colonial Office Report].

These observations regarding the distribution of *G. palpalis* in the Siroko Valley were made between 17th November and 31st December, 1913.

The geography of the valley with the distribution of tsetse is shown in a map which accompanies the report. There are three narrow strips of fly-infested forest along parts of the three rivers which go to form the Siroko, and fly is also found in two swampy forest areas in communication with the Siroko river. The fly area in the Siroko valley as a whole is isolated from other fly areas.

The infectivity of *G. palpalis* in the valley was determined by feeding experiments and by microscopic examination. A number of flies (1,004) were fed in groups upon two healthy dogs and one healthy goat but the animals did not become infected. These flies were subsequently dissected and the gut and proboscis examined. Flagellates were found in the gut of 24 and in the proboscis and gut of one, but in the last case the proboscis forms were not attached and were few in number. From the morphological character of the parasites found the author concludes that they did not form part of the life-cycle of any of the pathogenic group of mammalian trypanosomes but were derived from crocodiles which are very numerous in all the rivers of the valley.

Nine inoculations into dogs were made from the blood of buck shot in the valley with negative results. No case of sleeping sickness has ever been reported from the Siroko valley. As a result of this work Miss Robertson writes, "We seem therefore justified in concluding that the mammalian group of trypanosomes has not yet arrived in the Siroko Valley fly-belt."

The Siroko valley is closed at the present time in so far as the cultivation of land and the building of permanent huts are concerned, but there is no attempt made to exclude people from the valley.

With regard to the question of re-populating the district Miss Robertson states that experience points to the conclusion that an area opened under proper regulations achieves a more satisfactory level of safety than a similar area insufficiently closed. The area to be cleared in the Siroko Valley is not excessive nor would clearing be difficult; the population is very large and there is a great demand on the part of the people to occupy the land.

The second portion of the report deals with the administrative aspect and general recommendations for the safe handling of the area in question. Details are given of a suggested scheme for the re-population of the valley.

W. Y.

JACK (Rupert W.). **Tsetse-Fly Investigations, Sebungwe, August-September 1916.**—*Report to Director of Agriculture, Salisbury, Rhodesia, British South Africa Company.* Dated 23rd September 1916. [MS. Report received in Colonial Office, November 27, 1916].

This report refers to a visit to certain of the tsetse-fly areas in the Sebungwe district during August-September 1916. Details of the itinerary are given.

The fly continues to spread rapidly in certain parts of the district, especially in the south-west corner of the belt. In other portions of the belt (Headwaters of the Mzola River) the fly although not actually spreading is increasing in number rapidly. The first record of fly in this area was in 1914 and now the pest is present in great numbers.

As a result of observation upon an outbreak of trypanosomiasis (*T. pecorum*) amongst cattle on Meare's Farm—Sikombella River—Jack concludes that the disease is spread by some agency other than tsetse. [In this connection the work of VAN SACEGHEM might be consulted (see this *Bulletin*, Vol. 9, p. 33).]

The remainder of the report concerns itself with the question whether a certain small fly area—the Sipani Vlei—would be suitable for an experiment to ascertain the effect of the exclusion of game. Jack concludes that "apart from this drawback [its remoteness: the place is 3½ days from Gokwe] Sipani Vlei from its limited extent, intense infestation, and isolated position in the dry season, is admirably suited for an experiment, which would, if effectively carried out, supply very valuable information on the relation of big game to tsetse-fly."

W. Y.

BAUGNIET. **La Trypanosomiase animale à la Station expérimentale d'Elevage de Miao (Kasai).**—*Bull. Agric. du Congo Belge.* 1915. Sept.-Dec. Vol. 6. No. 3-4. pp. 222–249. With 6 plates.

Miao (Kasai) has not escaped trypanosomiasis any more than other breeding stations in the Congo. Tsetse is relatively scanty in this district and so far as the author is aware only *G. palpalis* is present. Tabanids are common and a dozen species were found; they occur at two seasons of the year—May, the end of the rainy season and September, the beginning of the rainy season. *Stomoxys calcitrans* is found in considerable numbers in the rainy season. The author believes however that it is unnecessary to incriminate any other agent than Glossina as concerned in the transmission of *T. dimorphon-congolense* and *T. cazalboui*.

Regarding the various trypanosomes found, *T. dimorphon-congolense* occurred 67 times—in 65 cattle and 2 horses. The nomenclature *dimorphon-congolense* is used as it is difficult to distinguish by simple examination between *T. dimorphon* (Laveran) and *T. congolense* (Broden). The parasite in question differed from *T. dimorphon* (Laveran) in that it did not exhibit any long forms (20–22$\mu$) typical of the latter, and again it did not correspond exactly to BRODEN'S description of *T. congolense* as it possessed longer and narrower forms than *T. congolense* (Broden). *T. cazalboui* was met with 22 times in cattle and *T. ingens* three times, twice in cows and once in a heifer.

An account of the symptoms in infected cattle and horses is given ; stress is laid on keratitis.

The main portion of the paper concerns itself with an account of various attempts at therapy. A number of methods were employed and so far as infections with *T. dimorphon-congolense* were concerned the best results were obtained with orpiment and atoxyl. Of eight animals infected with *T. dimorphon-congolense*, seven were cured by an injection of 1 gm. of atoxyl and 4 gm. per 100 kilos of body weight of orpiment. The eighth animal, which received 1 gm. of atoxyl and 6 gm. per 100 kilo of body weight of orpiment, died a month later. This large proportion of cures by arsenical preparations reported to have little effect on *T. dimorphon* and of which only the orpiment is active against *T. congolense* appears to the author to support the view that the parasite in question, *T. dimorphon-congolense*, is distinct from the other two.

For the treatment of cattle infected with *T. cazalboui* emetic-orpiment was most successful. Of five animals treated in 1914 three were cured ; the other two were lost through errors of technique.

W. Y.

Mitzmain (M. Bruin). **A Digest of the Insect Transmission of Disease in the Orient with Especial Reference to the Experimental Conveyance of *Trypanosoma evansi*.—*New Orleans Med. & Surg. Jl.* 1916. Dec. Vol. 69. No. 6. pp. 416–424.**

Most of the work dealt with in this paper has been published elsewhere and has already been summarised [see this *Bulletin*, Vol. 2, p. 130 and 133, and Vol. 3, p. 31].

The author reviews the evidence incriminating *Tabanus striatus* as the vector responsible for the transmission of surra. Under natural conditions this horse fly invariably interrupts itself while sucking blood and requires several distinct insertions of its proboscis before satiation is reached. Experimentally the insect has been observed to insert its proboscis 52 times when applied at short intervals to two hosts alternately. This suggests that a fly given the necessary materials for operating, namely, sick host and healthy host would transmit infallibly. Horse flies permitted to bite a highly infected horse and then successively applied to three healthy animals at intervals aggregating five minutes, infected the first of these but not the second and third. It was found that *Tabanus striatus* could transmit at various intervals from a few seconds up to 15 minutes after biting a sick animal, but not after longer intervals varying from 20 minutes to 26 days.

*Tabanus striatus* harboured *T. evansi* in an unchanged form for a period of 30 hours and the parasites were proved by inoculations to remain virulent for at least ten hours. There was no evidence of hereditary transmission. Preventive measures consisted in attacking the fly in the larval stage by chemically treating the sand along lake shores found harbouring them ; protection of animals in darkened sheds, which was found to repel the flies ; and avoiding bites in enzootic areas by keeping animals in the open only during the hours between 7 p.m. and 5 a.m.

Details of experiments and observations to ascertain the rôle played by *Musca domestica* and *Stomoxys calcitrans* as factors in the spread of surra are given ; these have already been summarised [see this *Bulletin*, Vol. 2, p. 130].

The author is of opinion that every outbreak of surra in the Philippine archipelago which occurred during the three years he worked there could be accounted for satisfactorily by the direct method of transmission.

W. Y.

VAN SACEGHEM (R.) & NICOLAS (E.). **L'émétique dans le traitement des trypanosomiases.**—*Bull. Soc. Path. Exot.* 1916. Dec. Vol. 9. No. 10. pp. 813–823.

As tartar emetic clears the peripheral blood of trypanosomes with such remarkable speed—a dose of 6 mgm. per kilo injected subcutaneously sterilised the peripheral circulation of guinea-pigs infected with *T. ugandae* or *T. congolense* in eleven minutes—the question arises, whence come the trypanosomes which cause relapses. Two theories present themselves, firstly that there exist individuals resistant to emetic and secondly that there are in the organism parasites which escape the action of the drug.

Against the first view is the fact that forms resistant to emetic have not been observed by any worker, and moreover the blood of an infected animal treated with emetic does not produce infection in a healthy animal when injected. It is therefore necessary to conclude that the second hypothesis is the true explanation.

It has been shown that the serum of guinea-pigs which have received a lethal dose of emetic has not any trypanocidal action *in vitro*, even a few minutes after the administration of the emetic subcutaneously. Nevertheless in spite of the short sojourn of the drug as such in the blood it suffices to destroy all the trypanosomes swarming in the blood ; but perhaps owing to rapid elimination or, it may be, to special modification which it experiences the drug exerts too little penetrating an action to destroy trypanosomes shut off in lacunae deep in the tissues.

The author has investigated the action of serum and of acid and alkaline solutions upon emetic and its trypanocidal action.

When serum is added drop by drop to 10 cc. of a saturated (5 per cent.) solution of emetic one obtains with the first drop an abundant and voluminous albuminous precipitate, which dissolves in slight excess of serum and also in alkalies or alkaline carbonates. This precipitate does not appear in solutions of antimony tartrate to which marine salt has been previously added nor in dilute solutions. In solutions of intermediate strength it is replaced by a cloudiness. If the albuminous precipitate be dissolved in excess of serum a clear solution results from which a precipitate is thrown down by acid solutions such as tartaric acid ; this precipitate is not soluble in excess of acid but dissolves on the addition of alkali. It appears therefore that serum, thanks to its alkalinity, is able when present in sufficient quantity to prevent the precipitation of the albumen by emetic.

The alkalinity of serum, which is due especially to the bicarbonate and phosphate of sodium, in addition to neutralising the acidity of the emetic causes later the appearance of another precipitate, a fine white

powder differing from the first and consisting of a mixture of calcium emetic and oxide of antimony. This precipitate does not appear instantly, its rate of development depending on the proportions of serum and emetic present. It forms more rapidly at 37° C. than at ordinary temperature. Insoluble in water it dissolves in hydrochloric acid and in tartaric acid and the solutions give the reactions characteristic of antimony.

These observations indicate the manner in which emetic behaves in the presence of serum. If a 2 per cent. solution of emetic be mixed with an equal volume of serum and injected after some seconds of contact it is observed that its trypanocidal activity is lessened, and furthermore that its irritant action on the tissues is diminished. The precipitate of antimony which is formed by the action of serum in excess on emetic, when washed and injected into an infected animal has a direct trypanocidal action. Tartaric acid has not *in vivo* any trypanocidal action, and the administration of ·01 gm. of this prevents the action of a therapeutic dose of emetic on an infected mouse. Tartaric acid is transformed as fast as it gets into the blood into tartrate of sodium, which has no trypanocidal action and for unknown reasons impedes the trypanocidal effect of emetic.

Hydrochloric acid (1 per cent. solution) is without trypanocidal action in mice. The carbonate and bicarbonate of sodium lessens the toxicity of emetic.

*In vitro* the carbonate and bicarbonate of sodium in isotonic solution have no action on trypanosomes and when added to emetic diminish, as does serum, the trypanocidal property of this substance. Tartaric acid (2 per cent. solution) exerts a distinct trypanocidal action *in vitro* owing to its acid character; previous neutralisation by sodium carbonate hinders this.

The results obtained indicate that in emetic it is the group SbO which exerts the trypanocidal property, since the tartrate is after neutralisation devoid of harmful action on trypanosomes; as an acid the latter has, however, among other advantages the property that it presents the antimony in a soluble and stable form in water.

The authors discuss the various ways in which emetic can be administered. Subcutaneously it is apt to produce severe irritation and sloughing. Intravenous injections of aqueous solutions are well tolerated by man and animals. When given per os the action of emetic is unsatisfactory and aleatory. Van Saceghem has introduced an intramuscular method which is not attended by abscess formation.

A fine suspension of emetic in olive oil* or liquid paraffin, to which camphor can be added, causes comparatively little irritation when given subcutaneously and is well tolerated intravenously by large animals. The addition to a 5 per cent. solution of emetic of an equal volume of serum, or of a solution of bicarbonate of sodium causes the emetic to lose its irritant character.

Although *T. cazalboui*, *T. ugandae* and *T. congolense* disappear from the peripheral circulation within a few minutes after intravenous, subcutaneous and intramuscular injections of emetic, the results in the case of other trypanosomes is not so satisfactory. Whilst recognising

* Tartar emetic in olive oil was injected by Plimmer and his co-workers in 1908–9.

a special resistance of some species of trypanosomes the authors believe that the unsatisfactory results obtained in the treatment of certain infections is due to the fact that those trypanosomes, e.g., *T. gambiense* and *T. brucei*, which resist the action of emetic do so—at least in part—because of their tendency to lodge deep in lacunae in the organism and thus escape the action of the drug.

According to the experience of Van Saceghem it is possible to cure bovines infected with *T. cazalboui* with a single intramuscular injection of emetic. In order to obtain the maximum effect of emetic it is necessary to produce a profound action of this drug in the organism. This can be arrived at in various ways.

1. By administering massive doses dissolved in water. As such doses are toxic and depressant it is advisable to associate them with atropine.

2. By giving emetic in suspension in oil. This method prevents rapid diffusion, and permits the emetic to act deeply and at the same time allows of the use of large doses. The authors consider it of advantage to add camphor to the suspension. They recommend the following method of preparation. Emetic is ground up finely in a mortar with the oil, the uniform suspension is then poured into a flask containing a few glass beads and sterilised at 110° C. per 15 minutes. After cooling add the desired quantity of camphor (10–25 per cent.) preferably dissolved in a little ether. Before use the mixture should be shaken vigorously.

The paper closes with some remarks on the treatment of trypanosomiasis by emetic.

Suspensions of emetic in oil can be employed subcutaneously in large animals: 4–6 mgm. per kilo of emetic suspended in 100 cc. of camphorated oil (the camphor being 10–25 per cent.) are the quantities recommended.

Intravenous injections of 1 to 2 gm. dissolved in physiological serum give excellent results in large animals. In order to retard and prolong the action of emetic given intravenously the drug should be suspended in camphorated oil. The authors have injected into horses 1 gm. of emetic suspended in 20–25 cc. of oil containing 4–5 gm. of camphor without damaging the animals.

After intramuscular injection of 6 mgm. per kilo of emetic in 50 cc. of physiological serum the reaction is nil or transient and there is never any abscess formation. Intramuscular administration of suspension in camphorated oil acts well; the dose is 6 mgm. of emetic per kilo. A suspension of 2 gm. of emetic is made in 100 cc. of oil containing 10 to 20 per cent. of camphor.

W. Y.

LAVERAN (A.). **Surra, nagana ferox, nagana de l'Ouganda et infections dues au** *Trypanosoma rhodesiense.—Bull. Soc. Path. Exot.* 1916. Nov. Vol. 9. No. 9. pp. 731–738.

Reference is made to the difference of opinion amongst various workers as to the identity and non-identity of *T. brucei* and *T. rhodesiense*. BRUCE and his colleagues concluded mainly on biometric grounds that the two are identical. Laveran recalls his experiments showing that a ram and a sheep immunised to *T. brucei* (Plimmer and

Bradford) were susceptible to infection with *T. rhodesiense*; as a result of this and similar observations he considered that the two parasites are not identical. Under the name nagana have been confounded animal trypanosomiases of different nature and the question of the identity or non-identity of the virus of Zululand (Plimmer and Bradford), nagana ferox and the nagana of Uganda is important. Stephens and Blacklock showed that the parasite of Nagana of Zululand is monomorphic whilst that of Uganda is dimorphic and hence is to be regarded as distinct; they gave the name *T. ugandae* to the latter parasite. Mesnil successfully infected with nagana of Uganda a goat immunised to the Zululand strain.

In the present experiments Laveran employed the following strains: the virus of surra of Mauritius which had been preserved in his own laboratory, the virus of nagana ferox of Ehrlich, the virus of nagana of Uganda obtained from Bruce and finally *T. rhodesiense* received from the Runcorn Research Laboratory. Five goats and a sheep were inoculated with one or more of these strains.

Goat 1.—A healthy animal inoculated with the virus of Uganda; it became infected and died in the 66th day.

Goats 2 and 3.—These animals, which had been previously immunised against the virus of surra of Mauritius, were inoculated with the Uganda strain, became infected, and died on the 96th and 53rd days respectively.

Goat 4.—This animal was inoculated in September 1914 with nagana of Uganda, it became infected but recovered, and in June 1915 was immune to this trypanosome. It was inoculated in September 1915 with *T. rhodesiense* and became infected; in June 1916 it was immune to this parasite also. In August 1916 it was found to be immune to nagana ferox.

Goat 5.—Inoculated with nagana ferox in April 1915 and by September of the same year had acquired an immunity to this trypanosome. In January 1916 it was twice inoculated with nagana of Uganda, but did not become infected. In August 1916 inoculation with *T. rhodesiense* was successful.

A sheep which in August 1914 had acquired a solid immunity against nagana ferox was inoculated in November of the same year with nagana of Uganda and became infected and died.

Details of these observations are given at length. The author draws the following conclusions:—

As Goats 2 and 3, immune to surra of Mauritius, were just as susceptible to infections with nagana of Uganda as the normal animal Goat 1, it follows that these two strains of trypanosomes are not related to one another.

Because Goat 4, immune to nagana of Uganda, and Goat 5, immune to nagana ferox and also nagana of Uganda, were both susceptible to infection with *T. rhodesiense*, Laveran concludes that both the former strains are distinct from *T. rhodesiense*.

The facts that Goat 4 immune to nagana of Uganda and *T. rhodesiense* did not become infected after inoculation with nagana ferox and that Goat 5, immune to nagana ferox, was not susceptible to nagana of Uganda whilst a sheep immune to nagana ferox became infected and died when inoculated with nagana of Uganda, is explained by the author on the hypothesis that nagana of Uganda and nagana ferox are varieties of the same species. Laveran states in conclusion that he is

unable to observe any morphological distinction between these two strains sufficiently marked to preclude this theory.

In the discussion which followed this paper Mesnil stated that the nagana of Uganda which when brought to Europe by Bruce and also later (1911) when studied by Stephens and Blacklock was polymorphic, was in 1913 becoming monomorphic, the short aflagellar forms tending to disappear.

Van Saceghem said that in nature *T. brucei* was polymorphic and that passage through the white rat caused the parasite to become monomorphic.

W. Y.

Macfie (J. W. Scott). **The Results of Dissections of Tsetse Flies at Accra.**—*Report of the Accra Laboratory.* 1915. pp. 49–54. With 4 text figs. & 1 plate. London: J. & A. Churchill.

A few miles outside Accra *G. palpalis* and *G. longipalpis* occur in considerable numbers; the results of dissection of 75 of the former and 8 of the latter are given in a table.

The parasites found in the proboscis of the single infected *G. longipalpis* were small delicate Crithidia, probably developmental forms of *T. vivax*.

Of the eleven *G. palpalis* found to be infected with trypanosomes eight were males and three females. Three of the flies had an infection of the gut and salivary glands, one of the proboscis and gut, three of the proboscis only, and four of the gut only. In five cases (one proboscis infection, one gut and proboscis and three gut and salivary glands) animals were inoculated with the infected parts but no infection resulted. Feeding experiments conducted with the same flies before dissection were likewise negative. In view of these negative results it is difficult to decide what trypanosomes the developmental stages in the flies represented. The commonest trypanosomes at Accra are *T. pecaudi* (*T. brucei* of Uganda), *T. vivax* and *T. congolense*. Probably therefore the infection of the proboscis was *T. vivax*, and those of the gut and salivary glands *T. pecaudi*; none of the infections resembled stages in the development of *T. congolense*.

Several other infections were found in *G. palpalis*. In the gut of one male were spirochaetes similar to those discovered in the gut of a *G. tachinoides* at Eket [this *Bulletin*, Vol. 5, p. 293]; inoculation into a guinea-pig was without result.

*Fungal infection.*—One male *G. palpalis* was found to be infected with a fungus. Superficially the fly looked healthy, but the abdomen was rather swollen and pale coloured posteriorly. A large cheesy mass was expressed consisting of a dense network of fungal hyphae. The fungus was restricted to the abdomen. In general appearance the fungus was not unlike a tinea; possibly infection was contracted by biting some animal suffering from a skin disease of this description. The fungus is illustrated by a plate.

*Sporocysts.*—Lying free in the abdominal cavity of two *G. palpalis* cysts were found. The smallest measured was 384$\mu$ in diameter; it consisted of a thin wall enclosing a spherical body, composed of granular material with a clearer periphery that measured 304$\mu$ in

diameter. In larger cysts a great number of columnar prominences were seen to have budded off on the periphery of the spherical body and the central granular mass itself seemed to show divisions into a number of circular or ovoid masses. Finally cysts measuring 400–560$\mu$ in diameter were seen, filled with innumerable sporocysts, each 36$\mu$ in diameter and containing about 40 sporozoites. The sporozoites were sickle-shaped bodies measuring 23$\mu$ by 4$\mu$; each contained a nucleus near the centre. Diagrams illustrate these points.

Reference is made to the fact that Chatton and Roubaud have described cysts in the abdominal cavity of *G. palpalis* and that these authors considered them to be probably the sporogonic stage of a haemogregarine of a reptile or lizard [this *Bulletin*, Vol. 2, p. 55].

W. Y.

Ritz (Hans). **Ueber Rezidive bei experimenteller Trypanosomiasis. II. Mitteilung.** [On Relapses in Experimental Trypanosomiasis. 2nd Communication.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1916. Sept. Vol. 20. No. 17. pp. 397–420.

The strain of trypanosomes employed by Ritz was, as in his previous work [see this *Bulletin*, Vol. 4, p. 265], *T. brucei* (Prowazek). As a result of the observations recorded in this paper it appears that trypanosomiasis must be regarded as a typical relapsing infection. The whole mechanism of relapse formation is, as is demonstrated anew in the present work, governed by the variability of the parasites, a fact which was first shown by Ehrlich. The trypanosomes protect themselves against the action of anti-bodies by the formation of new races. Of great importance for the course and duration of a disease is the number of possible variations the parasite is capable of; in some infections (relapsing fever) this is limited, but in others, especially in trypanosomiasis as is shown by the author's investigations, it is inexhaustible. In the first case, owing to the limitation of the number of possible variations of the parasite, the infection is destroyed by normal immune body formation; whilst in the second case, owing to the unlimited capacity of the parasite to produce new races, exhaustion of the antibody forming power of the organism occurs and death results.

It is clear that the old laboratory strains of trypanosomes which one is accustomed to regard as original strains (*Ausgangstämme*) are really nothing of the sort, but in reality relapse strains which have been obtained by inoculation of mice from an infected animal and only after year long passages through mice have been passed on to a new species. In a similar manner the parasites with which Glossina infects itself are really relapse strains; that these parasites during the very distinct protoplasmic changes which occur in their sexual development in the insect also undergo modification in their receptor apparatus is more than probable, but it is yet to be proved that this metamorphosis results in a race with a simple receptor apparatus.

For experimental details this paper, which is of a rather technical character, should be consulted in the original by those interested.

W. Y.

Platau (Lilli). **Untersuchungen über die Trypanozide Substanz des menschlichen Serums bei Gesunden und Leberkranken.** [Investigations on the Trypanocidal Substance of Human Serum in Health and in Disease of the Liver].—*Zeitschr. f. Hyg. u. Infektionskr.* 1916. Vol. 81. pp. 401–431.

In the experiments described in this paper the author used mice infected with nagana (Prowazek). At the time of inoculation of the virus the animals were injected intraperitoneally with normal serum and with serum from patients suffering from various affections of the liver. The results of these prophylactic injections are set forth in a series of tables.

The conclusions are :—

The content of human serum in trypanocidal substances undergoes not inconsiderable fluctuations even in healthy persons.

In the process of curing experimental trypanosomiasis by injections of human serum there are involved specific trypanocidal immune bodies.

In circumscribed affections of the liver the trypanocidal content of human serum is not lessened.

In very icteric individuals the trypanocidal substances of the serum are diminished in a high degree and frequently are completely lost.

The addition of bile to active human serum *in vitro* causes the trypanocidal substance to disappear ; the taurocholates are not concerned in this process.

In diffuse liver conditions where icterus is not a feature the trypanocidal substances in the serum are only diminished when the disease is reaching its final stage.

W. Y.

Iturbe (Juan) & Gonzalez (Eudoro). **A New Trypanosoma of the *Vampirops lineatus*.**—7 pp. With 2 plates. Laboratory of Dr. Juan Iturbe. 1916. Caracas, Venezuela : Tip. Cosmos.

A trypanosome, which the authors consider to be a new species, was found in one of 65 bats examined. The parasite has a free flagellum. Seven specimens were measured and details of the measurements are given : Average length, 19·5$\mu$ ; maximum, 20·5$\mu$ ; minimum, 16·6$\mu$. Divisional forms were seen in the peripheral blood ; in organ smears the authors claim to have seen evidence of schizogony. The name *T. lineatus* is given to the parasite. The note is illustrated by a coloured plate. [Both the note and the plate are somewhat crude. Figure 3 in the plate which is labelled " Trypanosoma without undulating membrane and without flagellum " represents a parasite with a well marked undulating membrane, whilst Figures 4 to 9 which are intended to represent different stages of schizogony appear to the reviewer more like distorted or degenerated forms than anything else.]

W. Y.

Kuhn (Philalethes). **Die Geschichte der Schlafkrankheit in Kamerun und ihre Lehren.** [The History of Sleeping Sickness in the Cameroons and its Lessons.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1916. Vol. 81. pp. 69–137.

This long paper gives a very full account of sleeping sickness in the Cameroons. The results obtained by the various Commissions sent

out by the French and German Governments to study sleeping sickness are referred to in considerable detail. [These reports have already been summarised in this and the *Sleeping Sickness Bulletin.*]

W. Y.

## Correction.

On page 264 of Vol. 8 of this *Bulletin* in a summary of the Nyasaland Protectorate Sleeping Sickness Diary, Part 25, it was stated that Dr. Davey found trypanosomes by examination of blood smears in four antelope out of 25 wild animals shot, i.e., 16 per cent., and that the Sleeping Sickness Commission found 31·7 per cent. infected " in a a part of the same area." The last seven words are incorrect. The Sleeping Sickness Commission results were obtained in the fly country below Kasu Hill, i.e., in a portion of the Proclaimed Area of the Dowa District, whereas Dr. Davey's were obtained in the Ngara Sub-district of the Marimba District, which, as Davey points out in a letter, had, until recently, been regarded as free from trypanosome infection.

A. G. B.

## TYPHUS.

HALL (Horace C.). **Typhus Fever.**—*Military Surgeon.* 1916. Nov. Vol. 39. No. 5. pp. 474–490. With a map.

This very interesting paper deals more particularly with typhus as it appears in outbreaks on the Mexican frontier. A short historical survey of the epidemiology of typhus is followed by an account of "Rio Grande Fever," the name under which typhus has apparently been known for some years in Texas. In 1915, the present author drew attention to the fact that this malady was in reality a mild form of typhus. During 15 years' residence in Mexico, he had opportunities of treating hundreds of cases. The malady is considered to be endemic in the mountainous tablelands of Mexico, and to have existed there since the time of the Spanish conquest.

The precautions taken by Dr. HUSK, one of the pioneers in America of typhus investigation, are given. They include the use of silk garments for underwear, the use of rubber elastic around the ankles, rubber gloves coming up over the shirt sleeve and elastic bands to make the union impassible to vermin, three baths daily, the last being of gasoline, and clean sheets, fumigated and disinfected before use on the bed each day.

From personal experience of epidemics, the author states that "granting that the body louse does convey the infection, that the head louse and bed bug are suspicious conveyors, it has not been conclusively proved to the writer that vermin are the only means of conveying the disease." The predisposing causes of typhus are briefly famine, filth, overcrowding, and conditions favourable for the thriving of vermin. Climate influences the virulence of infection. The relatively mild form of typhus known as Brill's disease flourishes in New York City during the warmer months; at the Rio Grande border of Texas, which is practically at sea-level, there is the Rio Grande fever, which is an attenuated form of the virulent typhus of Mexico. Age, sex and occupation have little influence as predisposing factors.

The period of incubation varies from 5 to 15 days, and the author wishes "to especially call attention to the text-book positive statements, which are in error, that the incubation period is a fixed time of not less than twelve days," so far as Mexican typhus is concerned. There is nothing distinctive in the morbid anatomy of this form of typhus.

Three distinct forms of typhus occur:—The fulminating form, in which the patients are attacked and die very suddenly, even before the rash or any of the typical symptoms appear; the "text-book" form of typhus; and the attenuated form known as Brill's disease and as Rio Grande fever, the latter being more virulent than Brill's disease. The fulminating form occurs only during an epidemic; the cases resemble those of cerebro-spinal meningitis. The fulminating or the milder form of typhus may arise from the usual epidemic form. So far, no virulent case originating from Rio Grande fever has been observed. The latter fever differs from the epidemic form only in the more severe symptoms. In the milder form, the eruption rarely goes on to the haemorrhagic or purplish stage. The degree of bacterial thrombosis

depends on the virulence of the infection. Severe involvement of the central nervous system is not seen. " The weakness is never so marked, but the general debility is out of all proportion with the degree of illness indicated by the other symptoms."

The preventive measures against the importation of typhus into Texas from Mexico are described. Foot passengers who reached Texas from Mexico were mostly immune. The railway communication with Mexico presented the greatest difficulty. When typhus broke out in Texas, it was the virulent epidemic Mexican form, and not the attenuated form already known there. The prevention of ingress into the State of any louse-infested person, along a frontier consisting of a fordable river of 2,000 miles line, was a great undertaking. Imported labour presented an added difficulty. Arrangements to prevent infection were in progress.

Many most interesting experiments were performed by the author on body lice. He found that live lice were still clinging to clothing after it had been washed in soap and water ; that live body " lice, when placed in a bottle with head lice, bed bugs, and raw meat, will first kill and devour the head lice, then the bed bug, and after the raw meat has been devoured, become cannibals to the extent of the survival of the fittest." The life-history of the body louse is outlined.

The procedure for louse eradication in Texas is fully described. For body lice, the clothing is placed in boiling water for 20 minutes, or thoroughly dipped in a mixture of vinegar and kerosene. Where many suspects are being handled, their clothing and baggage are placed in an autoclave, and kept there for 15 minutes, under not less than 90 pounds pressure. Special measures were adopted for dealing with head lice where clipping of the hair was not permissible, vinegar and kerosene mixture being forced through the hair by a garden spray at a pressure of 90 pounds by means of compressed air. A search through the baggage from Mexico, " even that of the better class Americans, who have had Mexican washwomen, has revealed that lice, bed bugs, and fleas are frequently found." Bad application of fumigation has caused it to fall into disrepute, but sulphur fumigation if properly applied, and for a sufficient time, will kill rats, bed bugs, lice and fleas. Formalin fumigation is of little use. Hydrocyanic acid fumes are efficient, but the danger to life of men is against its use. The author has obviated this by the use of a simple fumigation plant.

" An old box car can easily be arranged as a plant, all openings being sealed up. The following mixture is used for the generation of this gas : Potassium cyanide and commercial sulphuric acid each an ounce to two and a half ounces of water, for each hundred cubic feet of space to be fumigated, including that occupied by the material to be disinfected. Place the KCN in a piece of cheesecloth, or, better still, in a large castor oil gelatine capsule, drop it into the mixture of $H_2O$ and $H_2$ SO and get out quickly. Allow the quarters to become well ventilated before being opened."

With regard to treatment, the author " controls the fever with baths, the delirium with bromides and an ice cap, and gives egg albumen in water, even though it has to be placed in the stomach through a tube, passed through the nose." Immunising vaccine treatment, so far, has been of little use, having been prepared from the less virulent Brill's disease.

The author tried to find why " live lice could be found in empty freight cars which had been used to transport Mexican troops, weeks

before being used to import merchandise" into Texas. His experiments had some astonishing results, which may be of far reaching practical importance in combating louse-borne diseases. They are summarised by him as follows:—

"1. Body louse, taken from Mexican baby, was placed in bottle with head louse, taken from the same baby. At end of second day, body louse had eaten head louse. Two head lice were fed to this same body louse daily for three days.

"2. The same experiment was made on the same body louse, the crab louse being fed to it for three days. Then both head and crab lice were placed in the bottle with the same body louse and were eaten, the head lice being devoured first.

"3. Small black ants were next offered, and were readily disposed of.

"4. Daily, for three days, two bed bugs were consumed.

"5. Young body lice were placed in the bottle with the same body louse, and were quickly eaten.

"A piece of raw beef was then offered and eaten, until the thirty days' rations were completed.

"The louse used was a female, taken at random. During the time she was in the bottle, no nits were deposited. The experiment obviously explains the reason why typhus infection remains dormant in certain isolated locations and also that lice in freight cars, once infected with typhus, would be a source of danger, extending over a longer period than the louse has been supposed to remain alive on other than human blood."

A. Porter.

Public Health Reports. 1917. Feb. 2. Vol. 32. No. 5. pp. 197–198. —**Typhus Fever. Measures for the Prevention of its Introduction at El Paso, Tex.**

The presence of typhus fever in epidemic form throughout Mexico has caused the Public Health Authorities to institute measures with a view to preventing its introduction into the border towns of the United States. A chain of quarantine stations has been placed along the Mexican borders of the states of Texas and Arizona and all incoming travellers are submitted to a thorough inspection. If need be, their persons are freed from vermin by the application of gasoline or a mixture of vinegar and kerosene, and their clothes and luggage are sterilised by means of steam.

In order to prevent "the interstate spread" of the disease from El Paso [in which place several deaths from this cause are reported] and as an additional precaution "the railroad companies have been instructed not to issue transport to Mexican labourers unless they present a certificate of disinfection from the Public Health Service officer in charge of the border quarantine." During the week ending January 13th, 1917, 41,331 persons were examined at the quarantine posts along the Texas border, and of these, 2,406 were treated for the purpose of freeing them from vermin. Admission was refused in the case of 21 sick persons.

R. P. Cockin.

Dorendorf. **Beobachtungen bei einer kleinen Fleckfieberepidemie während des Feldzuges in Serbien.** [Observations on a Small Epidemic of Typhus during the Campaign in Serbia.]—*Deut. Med. Woch.* 1916. Mar. 23 & 30. Vol. 42. Nos. 12 & 13. pp. 345–347 & 375–379. With 10 charts.

This is an account of a small epidemic of typhus fever, which broke out amongst the troops operating in Serbia. The cases generally were

of a mild type, although more severe ones, several of which terminated fatally, are noted.

Cardiac dilatation, due to parenchymatous changes in the heart muscle, was frequently observed in the more severe cases. Dorendorf however regards the quality and frequency of the pulse as the best guide in prognosis.

In all the cases examined during the febrile stage of the disease, he found the organisms described by Prowazek to be present in the blood. These organisms were found in the plasma of the polymorphonuclear and mononuclear leucocytes, either singly or in pairs.

Blood films stained with Giemsa show these organisms to be rounded bodies, having a special affinity for the red stain, surrounded with a lightly tinted halo.

During the febrile period, a polymorphonuclear leucocytosis was regularly noted, which gave place to a lymphocytosis after the temperature had fallen. Eosinophile cells were absent from the blood throughout the course of the disease.

The writer observes that nuclear variations were a marked feature in the blood picture of the severe cases and were also seen in the milder cases at the height of the fever. A number of temperature charts illustrate the cases which are quoted and three are given which show the effect of the intravenous injection of Nucleo-Hexyl.

R. P. C.

Soucek (Alfred). **Ueber das Fleckfieber im Kindesalter.** [Typhus in Childhood.]—*Wien. Med. Woch.* 1916. Nov. 25. Vol. 66. No. 48. pp. 1808–1809.

In this paper the writer calls attention to the mild type of typhus fever which is frequently met with in children under the age of fourteen years. He states that during five months he had in his care 23 cases of this disease in children under this age and that all made good recoveries. During the same period 92 cases of the disease in older patients showed a mortality of five.

The rash in the milder cases is generally transitory and may easily be overlooked, whilst a prominent symptom may mask the true nature of the infection.

The danger of these cases to the community when unrecognised, and especially when they exist in a community near to, or in which troops are stationed, is apparent.

R. P. C.

Šimiček (Josef). **Wert der künstlichen Blutstauung als diagnostisches Hilfsmittel bei Fleckfieber.** [Value of Artificial Stasis in Diagnosis.] —*Wien. Klin. Woch.* 1916. Sept. 28. Vol. 29. No. 39. pp. 1236–1238.

In this article is described an ingenious method of precipitating the rash in early or late cases of typhus by means of the production of an artificial blood-stasis in one or other of the limbs. This is brought about by the application of a tourniquet, and the author claims that the rash is invariably called forth, however early in the disease the test is made.

The use of this method should prove of value in the differential diagnosis of early and doubtful cases.

A similar phenomenon is produced under identical circumstances in the case of cerebro-spinal meningitis.

R. P. C.

JACOBSTHAL (E.). **Eine Anregung zur Anstellung von Kutisreaktionen bei Fleckfieber.** [Wanted a Cuti-Reaction in Typhus.]—*Deut. Med. Woch.* 1916. Sept. 7. Vol. 42. No. 36. pp. 1093–1094.

The writer of the above article suggests that a skin reaction, similar to that obtained by von Pirquet's method in tuberculosis, would result from the injection of infected louse extract in typhus fever patients.

He considers that, in the present uncertainty as to the exact organism which produces the disease, this is the mode of procedure which is most likely to yield good results.

The need for some such simple method for confirmatory and diagnostic purposes is manifest.

R. P. C.

MEINICKE. **Ueber die Brauchbarkeit der bacteriologischen Typhusdiagnostik zur Differentialdiagnose zwischen Fleckfieber und Typhus.** [The Value of Widal's Reaction in the Diagnosis between Typhus and Typhoid.]—*Deut. Med. Woch.* 1916. Oct. 5. Vol. 42. No. 40. pp. 1214–1217.

Meinicke in the above article pleads for a more general use of Widal's agglutination test in the differential diagnosis of typhus from typhoid fever.

Many of the typhus cases are atypical, and confusion must arise unless some sure test to separate the two diseases is constantly in use. He cites a series of cases which he had examined in support of his appeal, in which he found that 25 per cent. were being treated for typhus on an erroneous diagnosis.

R. P. C.

BABES (V.). **Sur le diagnostic différentiel entre le typhus exanthématique et certaines formes hémorragiques de méningite cérébro-spinale.**—*C. R. Soc. Biol.* 1916. Oct. 21. Vol. 79. No. 16. pp. 857–860.

Cases of typhus occurred in Bucarest at the end of 1915 and beginning of 1916 among the civil population, while in the military barracks there was a fever showing strong resemblances to it. These latter cases were atypical, the fever irregular and less severe, the patients showing intense headache and diarrhoea. After the second day, roseolae and petechiae appeared. Several cases were cured, though the treatment is not stated. Details are given of three cases of meningitis, two of which died. The autopsies are given in detail and many of the features are not new. The chief new features consists of lesions in the skin at the level of the petechiae and especially of the haemorrhagic roseolae. The most characteristic lesion is found in the basal layer of the epithelium. Here there is an agglomeration of round bodies or diplococci,

varying in size and colouration, and Gram-negative. They are no doubt meningococci, some multiplying and some degenerating. From here, they invade the epithelial layers and are enclosed in the intracellular lymphatics. They penetrate the Malpighian layer and deform the nuclei of its cells. The meningococcus, while circulating in the blood, is more especially localised at the level of the roseolae. The cases are not typhus complicated by meningeal symptoms but cerebro-spinal meningitis with localisation of the meningococcus in the skin. This localisation is very important in practical epidemiology, as otherwise it would be very difficult to differentiate such cases from typhus.

A third case came under observation and was treated by the removal of cerebro-spinal fluid and the replacement of it by 20 cc. of anti-meningococcal serum. This was repeated for three days and, five days after, the man was clearly convalescent. In this case, the meningococcus was found in the cerebro-spinal fluid.

A. P.

Hanser (Robert). **Zur Aetiologie des Fleckfiebers.**—*Deut. Med. Woch.* 1916. Oct. 12. Vol. 42. No. 41. p. 1254.

Teichmann (Friedrich). **Zur Behandlung des Fleckfiebers mit Silbermitteln.**—*Ibid.* pp. 1256–1258. With 4 charts.

Toepfer (H.). **Zur Aetiologie und Behandlung des Fleckfiebers.**—*Ibid.* Nov. 9. No. 45. p. 1383.

In the first of the above papers Hanser confirms Toepfer's discovery of bacteria-like forms in the intestinal cells of lice fed on typhus fever patients.

The two latter papers are in complete agreement as to the value of "Fulmargin"—a silver colloid preparation—in the treatment of this disease. The drug is administered intravenously and the dose administered is 5 cc. [The strength of the solution injected is not stated.] Repeated injections are necessary up to a maximum of 8–10, although Teichmann records as many as 15–20 having been given without any ill effect upon the patient.

R. P. C.

Munk (Fritz). **Ueber die Wirkung und Anwendung des "Nucleo-Hexyl" bei Fleckfieber.** [The Action and Employment of Nucleo-Hexyl in Typhus.]—*Münch. Med. Woch.* 1916. Aug. 22. Vol. 63. No. 34. pp. 1239–1241. With 11 charts.

The author has investigated the action of Nucleo-hexyl in cases of typhus. The compound is one of nucleic acid with hexamethylenetetramine. The main conclusions reached as a result of his work are summarised. Nucleo-hexyl is not a specific agent against the excitant of typhus. It has some action in influencing the general processes of immunisation, similar to those of serum and vaccine treatments in other acute infectious diseases. The treatment can be given to cases with severe general symptoms. The objective action of the drug is usually not immediately perceptible. It can be tried in other acute infectious diseases.

Intravenous inoculation is used, a ten per cent. solution in sealed ampoules of ten cc. being apparently the dose. Immediately after the

inoculation, there is a short rise in temperature up to ½° C., and in from 12 to 24 hours there is a fall, often accompanied by shivering, perspiration and in some cases digestive derangements. The best results have been obtained from inoculations made between 4 and 6 o'clock in the afternoon. A second injection is given on the next day or on the second day after the first, and the injection solution should be at a temperature of about 30° C.

A. P.

Coglievina (B.). **"Dispargen"- Therapie des Fleckfiebers.**—*Deut. Med. Woch.* 1916. July 6. Vol. 42. No. 27. pp. 813–815.

The above paper is a record of the satisfactory results which the author has obtained by the use of "Dispargen"—a silver colloid preparation—in the treatment of typhus fever.

The drug was administered intravenously as a 2 per cent. solution, and 5 cc. of this solution was the dose usually employed. It was necessary to repeat the injections several times in the course of the treatment of each case.

Neither cardiac nor renal troubles complicated its use, and a case is quoted in which a satisfactory result was obtained, although pneumonia was a complicating factor.

Antipyretics were not used in the course of the disease, in those cases treated by these injections.

The notes on five cases, and the progress made under treatment, are incorporated in the paper.

R. P. C.

Hirsch (C.). **Zur Therapie des Fleckfiebers.**—*Deut. Med. Woch.* 1916. May 18. Vol. 42. No. 20. p. 599.

Hirsch states in this paper that he has had extremely good results in the treatment of typhus fever from the administration of repeated small doses of quinine. He recommends the following procedure:

Quinine hydrochloride 0·2–0·25 [gramme] to be given five or six times in the 24 hours. At the commencement of the illness, some preparation of digitalis should be given until the patient has had the equivalent of 1·0 gm. of Digitalis folia. In addition, even when the heart is sound, two intramuscular injections of Ol. camphorat. fort. are to be administered daily along with the quinine.

In cases of heart failure, due to enfeeblement of the vaso-motor control, larger doses of camphor in conjunction with caffein should be employed. Wherever possible, Hirsch recommends the treatment of typhus fever patients in the open air.

R. P. C.

da Rocha-Lima (H.). **Beobachtung bei Flecktyphusläusen.** [Observations on Typhus-Infected Lice.]—*Arch. f. Schiffs u. Trop.-Hyg.* 1916. Jan. Vol. 20. No. 2. pp. 17–31. With 1 plate.

The present paper deals with the excitant of typhus fever as described by Prowazek in the body louse. The author has examined both smears and sections of lice taken from patients suffering from typhus, and also examined similar preparations of lice from normal persons.

The microörganisms found in typhus-infected lice had resemblances with bacteria and with other schizomycetes. Variations in their morphology occur, some being ellipsoidal, coccus-like or rod-shaped. It was found that the organisms did not stain well with the usual bacteriological stains, and that the best results were obtained with Giemsa's stain. The bodies stain like spirochaetes, the colour being a clear ruby red, bacteria staining much deeper or at times blue. The bodies are considered to be bacteria-like organisms. The smaller forms measure 0·3$\mu$ by 0·4$\mu$, and some somewhat biscuit-shaped double forms, in stages of division, were 0·3$\mu$ by 0·9$\mu$. Experiments with respect to the filterability of the typhus excitant have so far given negative results, a Berkefeld V filter being used. Attempts at cultures on various agar media have also been unsuccessful.

The frequency of the occurrence of the bodies in lice is discussed. Most of the lice from prison camps ~~were~~ considered to be infected, while it was thought highly probable that all lice from typhus patients were capable of causing disease. Experimental transmission of typhus virus to monkeys by bites of lice has given unsatisfactory results. Eight out of ten attempts to transmit the virus to guineapigs, however, were successful. The quantity of material inoculated to man by the bite of a louse was shown to be very small, a female louse ingesting 0·00089 grams of blood, while a male louse sucks 0·000325 grams. 3 to 4 cc. of blood from a typhus patient are required to produce infection when inoculated to a guinea-pig. The louse does not transmit typhus mechanically, but the author has established that the bodies he has described multiply actively in the louse. The virus can be maintained in guinea-pigs, and the identity of the louse virus and that of human beings has been established by cross-immunity experiments with guinea-pigs.

By the examination of a number of sections of typhus lice and comparison with normal lice, it was found that the tiny bacillus-like bodies were present in great masses in the cells of the stomach, in the alimentary canal, and also in the kidney-shaped salivary glands of infected lice, and not in normal lice.

The author considers that the bodies that he has described as the excitant of typhus are really the etiologic agents because he has transmitted the disease by means of them, and they have been found present in the bodies of typhus lice. The plate, of four figures, shows in the first figure, the appearance of the bodies, while two figures depict their appearance in sections of the gut of the louse, and the fourth figure shows the appearance of the normal louse gut in section.

A. P.

da Rocha-Lima (H.). i. **Untersuchungen über Fleckfieber.**—*Münch. Med. Woch.* 1916. Sept. 26. Vol. 63. No. 39. pp. 1381–1384. With 3 figs.

ii. **Zur Aetiologie des Fleckfiebers.**—*Deut. Med. Woch.* 1916. Nov. 2. Vol. 42. No. 44. pp. 1353–1354.

The former of these papers gives an account of the investigations which the writer has carried out on the subject of typhus fever, its cause and transmission.

His results are briefly stated as follows :—

1. In one experiment, out of 13, he was able to satisfy himself that transmission of the disease was conveyed by a louse which had itself acquired the virus by hereditary transmission.

2. Repeated experiments with healthy lice demonstrated the fact that feeding upon typhus convalescents did not render the lice infective.

3. The virus circulating in the blood of typhus fever patients is so scanty, immediately after the fall of the temperature, that it is unusual for lice fed upon the patients at that time to become infected.

4. During the febrile stage of the disease one feed upon the patient is sufficient to infect lice.

5. A feed upon a typhus patient on the fourth day of the disease causes the appearance of " Rickettsia " infection in the louse four days afterwards.

That the louse was infective was proved by animal experiments and established by microscopical examination.

The manner in which the feeding experiments were carried out and the apparatus employed are described in the article.

The second of the papers is a controversion of statements made by Toepfer regarding the nature of the *Rickettsia Prowazeki* organisms found in the intestinal cells of infected lice.

R. P. C.

Toepfer (H.) & Schuessler (Hermann). **Zur Aetiologie des Fleckfiebers.**—*Deut. Med. Woch.* 1916. Sept. 21. Vol. 42. No. 38. pp. 1157–1158. **With 3 figs.**

Toepfer and Schuessler give an account in the above paper of their investigation on the aetiology of typhus fever. The following summary gives the main conclusions at which they arrived.

1. Bacteria-like organisms, whose form and appearance are characteristic, are constantly present in the intestinal canals of the body lice removed from typhus fever patients. These organisms are unlike any other parasite of the louse.

2. These organisms are found in the louse after it has been fed upon the blood of a typhus fever patient. Controls, not so fed, remained sterile.

3. Feeding experiments demonstrated that a patient who infected lice with this organism during the course of the disease did not infect them during the post-febrile period.

4. The eggs and progeny of infected lice are considered by the writers not to be infected.

5. The injection of the contents of the gut of an infected louse into a healthy guinea-pig produces a febrile condition similar, both as to course and incubation period, to that produced by the injection of the blood of a typhus fever patient.

6. Multiplication of the specific organism continues to take place in the gut of the louse and it remains infective indefinitely.

R. P. C.

Toepfer (H.) **Der Fleckfiebererreger in der Laus.** [The Agent of Typhus Infection in the Louse.]—*Deut. Med. Woch.* 1916. Oct. 12. Vol. 42. No. 41. pp. 1251–1254.

The head and body louse are both claimed by Toepfer to be capable of functioning as the transmitting agents of the organism producing typhus fever.

Smears made from lice, which had previously fed on the blood of infected patients during the febrile stage of the disease, were found to contain nearly pure cultures of the organism which Toepfer regards as the undoubted cause of the disease.

The author states that lice fed upon convalescent patients do not become infected, and patients free from lice are not considered by him to be a source of infection to their neighbours.

The chief sources of infection are stated to be the excrement of infected lice and the crushed bodies of such lice upon the skin and mucous surfaces. Abrasions and scratches of the skin are supposed to afford the means of entry to the circulation.

R. P. C.

Csernel (Eugen). **Ueber die Morphologie des Fleckfiebererregers.**—*Wien. Klin. Woch.* 1916. Dec. 28. Vol. 29. No. 52. pp. 1643–1646. With 5 text figs.

An interesting account of the various organisms which have been cited as the specific cause of typhus fever.

The polymorphism exhibited by one of these organisms, when grown on various culture media, is adduced to explain to some extent the diversity of opinion which has been expressed on the morphology of this organism.

The confusion has been still further increased by the fact that this organism appears different in form when stained with some of the commoner staining reagents.

Reproductions of five microphotographs illustrate the article and should be referred to by those interested.

R. P. C.

Hamdi (H.). **Ueber die Ergebnisse der Immunisierungsversuche gegen Typhus exanthematicus.** [The Results of Immunisation Experiments in Typhus.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1916. Oct. 20. Vol. 82. No. 2. pp. 235–242. With 1 chart.

Professor Hamdi here gives an account of the work which he and others have been carrying out in Turkey with the object of finding a means of inducing immunity against typhus infection in the human subject. He quotes one series of 120 cases in which each person received a subcutaneous injection of 5 cc. of defibrinated, but not inactivated, blood taken from convalescents from typhus fever. One of the series contracted the disease 14 days later, and died. Another also developed the disease but recovered.

Another series of 310 cases is quoted in which each was injected subcutaneously with 5 cc. of defibrinated, non-inactivated blood taken from typhus fever cases during the exanthem stage. Of this series 174 [i.e., 56 per cent.] developed the disease, and of these 49 [i.e., 28 per cent.] died.

The shortest incubation period noted was five days and the longest 23 days. The usual period for incubation was 12 days.

The subcutaneous injection of typhus serum, inactivated with chloroform, was experimented with by members of the German Red Cross at Ersindjan. Of the 20 persons injected with this serum none contracted the disease from its use. Immunity, however, was not induced, as one of these cases subsequently acquired the disease. Professor Hamdi claims the best results from the injection of defibrinated, inactivated blood from cases showing a florid exanthem. He inactivates the blood either by keeping it at 60°–62° C. for 30 minutes or in the cold for 24–48 hours.

R. P. C.

## RELAPSING FEVER AND OTHER SPIROCHAETOSES.

DUCHAMP. **La fièvre récurrente chez les Serbes.**—*Progrès Méd.* 1917. Jan. 13. No. 2. pp. 10–13. With 3 charts.

During six months spent in one of the hospitals attached to the Serbian Army, Major Duchamp had under his care seventy-one cases of relapsing fever, all of which made good recoveries.

As the type of the disease met with in Serbia appears to be peculiar in several of its features, and agrees with none of the described types in all its characteristics the author publishes his observations for general information.

The onset of the attack was invariably abrupt, the temperature rising rapidly to 39° or 40° C. This temperature was maintained throughout the initial attack, which was usually a period of 3–3½ days. Rarely, this attack was prolonged to four days, but in no case exceeded four and a half.

The daily variations of temperature during the febrile period rarely exceeded 1° C. and this variation was usually confined between the limits of 39°–40° C.

Following the initial attack the temperature fell rapidly to below the normal level, and throughout the apyrexial period a subnormal temperature was the rule.

This apyrexial period was usually (70 per cent. of the cases) of seven to eight days duration. At the end of the seventh or eighth day the temperature again rose abruptly to 39°–40° C., and the period of relapse was entered upon. The features and duration of the relapse are similar in all respects to those observed in the initial attack. Similarly, at the termination of the relapse, the temperature again descends to the subnormal level, and the normal temperature is only regained towards the end of the period of convalescence.

More relapses than one were rarely observed. The pulse rate throughout the course of the disease is relatively slow. During the febrile periods it is accelerated, but not in proportion to the rise in the temperature whilst, during the periods of hypothermia, the rate is constantly between fifty-four and sixty-four per minute.

Muffling of the heart sounds, especially of the first, is frequently noted during the attacks, and embryocardia is not uncommonly observed. Following the attacks, bradycardia and embryocardia may be marked features. The spleen is invariably enlarged during the whole duration of the illness, and may descend as much as three fingers' breadth below the costal margin. This organ, however, varies considerably in size at various stages in the disease, being at its maximum just previous to the fall in temperature at the end of the febrile periods. It is noted that this maximum enlargement of the spleen corresponds with the disappearance of the spirochaetes from the peripheral circulation. It should here be stated that spirochaetes are extremely scanty, even during the febrile stages of the disease.

Enlargement of the liver is also a fairly constant feature. The enlargement is usually of slight degree, but it may be palpable in some cases. The spleen rapidly recovers its normal size, after the termination of the disease, but the liver may be palpable for a much longer period. Jaundice is rarely observed and, when present, is not a marked feature.

Rectal haemorrhages and, more frequently, epistaxis call for treatment in some of the cases. The author notes that these haemorrhages are most frequently observed at the period of maximum temperature, just previous to the crisis.

Syncopal attacks were not a feature in any of the author's cases. He states that he guarded against this complication by the administration of daily injections of camphorated oil. The oil was given in large doses, 10–30 cc.

In the absence of salvarsan the treatment was largely symptomatic.

Major Duchamp emphasises, as characteristic features of the epidemic, the regularity of the duration of the attack, the nearly "mathematical exactness" of the duration of the apyrexial period intervening between the initial attack and the relapse, and the hypothermia and slowness of the pulse during this latter period.

In view of these clinical peculiarities the author questions whether Serbian spirochaetosis should not be regarded as a clinical entity.

R. P. Cockin.

TOEPFER (H.). **Die Uebertragung der Rekurrens durch Läuse.** [The Transmission of Relapsing Fever by the Louse.]—*Münch. Med. Woch.* 1916. Oct. 31. Vol. 63. No. 44. pp. 1571–1572. With 1 text-fig.

The investigations which Toepfer has carried out, in regard to the transmission of relapsing fever by the louse, are dealt with in this paper, and the main results at which he arrived may be briefly summarised thus —

1. The louse, after being fed on the blood of an infected patient, contains spirochaetes in its gut. These spirochaetes are capable of multiplying enormously in this position.

2. The spirochaetes retain, in the gut of the louse, their form, motility, virulence and staining properties.

3. Special developmental forms of the spirochaete are not found in the louse.

4. The transmission of the spirochaetes from the louse to man does not appear to result from its "bite."

5. The infection of man is assumed to be brought about by the crushing of the louse on the skin or mucous surface and the subsequent entry of the liberated spirochaetes into the human host is believed to take place through a scratch or other abraded surface.*

R. P. C.

KORBSCH (R.). **Ueber eine neue dem Rückfallfieber ähnliche Kriegskrankheit.** [A New War Disease resembling Relapsing Fever.]—*Deut. Med. Woch.* 1916. Mar. 23. Vol. 42. No. 12. pp. 343–345. With 4 charts.

An account of two epidemics of relapsing fever which occurred in the same regiments during two periods of the year 1915.

* NICOLLE, BLAIZOT and CONSEIL demonstrated this in 1912, in Tunis [see this *Bulletin*, Vol. 1, p. 32]. It is not stated where Toepfer's work was done—ED.

The fever was characterised by a duration of three days followed by a two days interval. The temperature was seldom higher than 39°·5 C. and the pulse was invariably relatively slow. During the interfebrile periods the temperature was usually sub-normal. Both liver and spleen were frequently found to be enlarged and tender on palpation.

Diarrhoea was a characteristic feature in most of the cases.

The blood in addition to showing the presence of spirochaetes (7-10$\mu$ in length) displayed a slight leucocytosis. The leucocytosis was mainly due to a relative increase in the lymphocytes. Four temperature and pulse charts together with an account of a typical case are incorporated in the article.

R. P. C.

Macfie (J. W. Scott). **Urethral Spirochaetosis.**—*Parasitology.* 1917. Feb. Vol. 9. No. 2. pp. 274–292. With 4 text figs.

This paper gives an account of an acute urethritis, occurring in a native of the Gold Coast, due to a spirochaete infection of the urethra. The discharge was profuse, sanious, thick and foul, and persisted for six days. The temperature was slightly raised and pains were complained of in several of the joints.

Two intramuscular injections of perchloride of mercury were given during the period of the discharge, each dose containing one-third gr. of the drug.

Spirochaetes were found in large quantities in the pus examined and 300 organisms which were measured showed considerable variations in size. The average length measurement is given as 11$\mu$, but forms as small as 5$\mu$ and as large as 20$\mu$ are recorded.

Some of the spirochaetes showed a membrane or crest. The cytoplasm is stated to be homogeneous and to contain chromatin granules and rodlets at frequent intervals along the body.

The number of curves or waves varied according to the length of the organism and a spirochaete of "about 11$\mu$ had, as a rule, four or five waves."

Macfie is of opinion that other factors (e.g., mode and rate of fixation) also play a part in determining the number of curves which the spirochaete possesses. Epithelial cells found in the purulent discharge were seen, in some cases, to be crowded with spirochaetes. In some of these cells, coccoid granules were also present, and these the author regards as the first stage in the life history of the organism. Macfie is of opinion that the whole life-cycle of the parasite is passed in the urethra and regards its developmental stages as occurring in the epithelial cells with which the urethra is lined.

He compares the development of the urethral spirochaete to that of *S. gallinarum* and other spirochaetes in the invertebrate host.

The name *Spirochaeta urethrae* is proposed for the parasite.

R. P. C.

Macfie (J. W. Scott). **The Prevalence of *Spirochaeta eurygyrata* in Europeans and Natives in the Gold Coast.**—*Lancet.* 1917. Mar. 3. pp. 336–340. With 1 text fig. & 1 chart.

As the result of a large number of examinations [number not stated] which the author has made of the faeces from Europeans, natives and

Syrians on the Gold Coast, he is of opinion that *S. eurygyrata* is practically a constant intestinal parasite of the residents there. He gives the last 20 cases of his series, which includes 5 Europeans, 14 natives and 1 Syrian, as typical of the rest. All the 20 examinations were positive and several of the cases showed the association of the spirochaete with flagellate and other intestinal parasites.

Extending his investigations to the faeces from sheep, cattle, goats, dogs, cats and rats, the author found that a " similar, if not identical, organism " was equally constant as a parasite.

The presence of these spirochaetes in the intestinal contents of a monkey, which died of amoebic dysentery, has previously been recorded on the Gold Coast by the author.

Macfie does not regard the organism as pathogenic, but, in certain circumstances, he finds it " difficult to believe that they can be entirely benign."

R. P. C.

## Spirochaetosis Icterohaemorrhagica.

Stokes (A.), Ryle (J. A.) & Tytler (W. H.). **Weil's Disease (Spirochaetosis Ictero-Haemorrhagica) in the British Army in Flanders.**—*Lancet.* 1917. Jan. 27. pp. 142–153. With 13 charts & 9 figs.

This is an account of spirochaetosis ictero-haemorrhagica as met with amongst the troops in Flanders, and the writers consider that there can be no doubt that the disease is identical with that described by Inada and his collaborators in Japan [see this *Bulletin*, Vol. 8, p. 51.] The virulence, however, of the European type of the disease appears to be much lower than in the type described by the Japanese workers, and the present writers state that the prognosis is favourable and the death-rate low—" less than six per cent."

With one exception, all the cases met with were from the non-commissioned ranks -" and practically always amongst the ' trench troops.' " Wet, badly-drained trenches appear to be an important factor, either predisposing, or possibly as a medium through which the causative agent may reach and perforate the skin of man. It is suggestive that the writers were unable to trace one case as having been infected whilst in rest billets. They cite the case of one regiment in which a number of cases had occurred whilst in the line; during their stay in rest billets no fresh cases were noted; upon their return to the trenches cases were again produced.

Experiments carried out with the view of determining whether lice were the transmitting agents of the disease yielded only negative results, and the writers state that " from every point of view we think it is improbable that lice are the intermediate hosts, if there be an intermediate host in the cycle of infection."

Similar experimental work with mosquitoes was also negative, and the localisation of the infective foci to certain stretches of trenches " is also in opposition to the hypothesis of transmission by the mosquito."

With reference to the appearance of jaundice in man, the writers have been struck by the occurrence of cases, presenting the clinical picture of the disease, in which this symptom was absent. Guinea-pig inoculations from these non-icteric cases produced the characteristic

disease in these animals; and smears from, or sections of, their tissues invariably showed the presence of spirochaetes. The absence of jaundice was estimated to be a feature in 40 per cent. of the human cases.

The writers have been able to confirm the observations of Inada and his collaborators both as to the reappearance of the spirochaetes in the urine after the tenth day of the disease and as to the formation of protective substances in the blood serum.

A footnote at the end of the paper states that they have also confirmed the presence of *S. icterohemorragiae* in the kidneys of the field rat.

Attempts to cultivate *Sp. icterohemorragiae*, as recorded by Ito and Matsuzaki [see this *Bulletin*, Vol. 8, pp. 53–4] have so far been unsuccessful.

This paper gives an excellent account of the pathological changes which occur in the disease both in man and the guinea-pig, and full details as to the technique employed in the experimental work are given.

R. P. C.

Moreschi (C.). **Appunti epidemiologici sulla spirochetosi itterogena.** [Epidemiological Notes on Icterogenic Spirochaetosis.]—*Policlinico.* Sez. Prat. 1917. Feb. 25. Vol. 24. No. 9. pp. 265–267.

Micheli (F.). **Osservazioni e ricerche sull' ittero epidemico castrense.** [Observations and Researches on the Epidemic Icterus of Armies.] —*Ibid.* pp. 268–271.

The number under review of *Il Policlinico* is given up to the discussion of ictero-haemorrhagic spirochaetosis by a number of writers. There has been a considerable amount of this disease on both the Trentino and the Isonzo fronts during the present war. Professor Moreschi gives particulars of 361 cases noted in three different hospitals on the Isonzo line between June and November of 1916 in which the mortality was very low, being only 0·55 per cent. Out of 100 cases directly observed only 48 showed any degree of fever, which had an average duration of six days. The clinical symptoms varied in several other particulars from the description given by Inada and Ito. The author, in conjunction with Professor Carpi, has already described the successful isolation of the spirochaete from these cases by the inoculation of blood into guinea-pigs.

Professor Micheli's cases came from the Trentino district of operations, and showed an equally benign character. Experiments initiated with a view to ascertaining the anti-spirochaetal power of the serum of patients are briefly described as not encouraging, and are to be recorded at greater length in a future memoir. In 33 per cent. of one series of experiments the serum of convalescents was found capable of postponing for several days the death of an inoculated guinea-pig, and in another series, in the same percentage, of protecting a guinea-pig against at least a four-fold lethal dose of virus.

J. B. Nias.

Sampietro (Gaetano). **La spirochetosi ittero-emorragica.**—*Ann. d'Igiene.* 1917. Jan. 31. Vol. 27. No. 1. pp. 23–38.

A systematic review of the present state of our knowledge of the form of infective icterus known as Weil's disease. The writer however points out that the disease as met with on the Italian front, and described by Italian writers, differs from Weil's classical description in several particulars, such as relative benignity, absence of fever, and of albuminuria. In cases recognised as spirochaetal, in addition, there is no splenomegaly, while on the other hand there is a general enlargement of the lymphatic glands which is not mentioned by Weil.

J. B. N.

Martin (Louis) & Pettit (Auguste). **Présence de *Sp. icterohemorragiae* chez le Surmulot de la zone des armées.**—*C. R. Soc. Biol.* 1917. Jan. 6. Vol. 80. No. 1. pp. 10–11.

The discovery by the Japanese observers that the field rat is able to function as the reservoir host for *S. icterohemorragiae* is confirmed by Martin and Pettit. Their work has been carried out on brown rats obtained from the area in which fighting is now going on in France. An emulsion of the liver, spleen and suprarenal body of one of these rats was injected into a guinea-pig, producing all the symptoms of spirochaetosis ictero-haemorrhagica and proving fatal thirteen days after injection. The post-mortem examination of this animal showed the lesions characteristic of the disease and subsequent investigation revealed a large infection of spirochaetes in the liver. The rat from whose organs the lethal emulsion was made, was apparently normal during life, but when killed marked hyperplasia of the spleen was noted.

R. P. C.

Martin (Louis) & Pettit (Auguste). **Evolution de la spirochétose ictérohémorragique expérimentale chez le cobaye.**—*C. R. Soc. Biol.* 1917. Jan. 20. Vol. 80. No. 2. pp. 65–66.

In recording the results of a series of experiments in which guinea-pigs were injected with blood or urine taken from cases suffering from spirochaetosis ictero-haemorrhagica, the authors point out that prolonged observation may be needed before a definite conclusion is arrived at. The incubation period of this disease in guinea-pigs may vary within wide limits, and death may not occur until as late as thirty days after inoculation.

R. P. C.

Costa (S.) & Troisier (J.). **Spirochétose ictero-hémorragique sans ictère, hémorragie ni rechute.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. Nov. 23. 3 ser. Vol. 32. Nos. 31–32. pp. 1806-1810. With 1 chart.

Attention is called in this article to cases of spirochaetosis ictero-haemorrhagica in which the essential characteristics of the clinical picture are absent, and the course of the disease is so mild as to endanger

the making of a correct diagnosis. Such a case is quoted in which a correct diagnosis was only arrived at after inoculation into guinea-pigs had given a positive result. In this case a slight and transient jaundice of the conjunctiva was present at the commencement of the attack, haemorrhages did not occur and no relapse ensued.

The writers consider that, as far as the patient is concerned, the failure to realise the true nature of the infection is relatively unimportant, but, from the epidemiologist's standpoint, these cases are of paramount importance.

R. P. C.

Costa (S.) & Troisier (J.). i. **Réactions méningées dans la spirochétose ictéro-hémorragique. Virulence du liquide céphalo-rachidien.** —*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. Nov. 23. 3 ser. Vol. 32. Nos. 31–32. pp. 1802–1806. With 1 chart.

ii. **Réactions cytologiques et chimiques du liquide céphalo-rachidien dans la spirochétose ictéro-hémorragique.**—*C. R. Soc. Biol.* 1917. Jan. 6. Vol. 80. No. 1. pp. 29–30.

The authors of these two papers state that meningitis is a nearly constant feature in cases of spirochaetosis ictero-haemorrhagica, and that they found it present in ninety per cent. of the cases which they examined. The condition is manifested clinically by stiffness of the neck and the presence of Kernig's sign.

Lumbar puncture shows the cerebro-spinal fluid to be under considerable pressure. This fluid is described as being limpid and more or less bile-tinged and, occasionally, as displaying fibrinous flocculi in suspension.

Cytological examination shows the presence of a marked leucocytosis, in which polymorphonuclear leucocytes represent 70–90 per cent. of the total white count. If, however, the examination be made towards the end of a case which is nearing convalescence, the tendency is towards an absolute lymphocytosis.

Chemical examination of the fluid demonstrates the presence of albumin and urea in excess, which may be considerable, and a deficiency in total chlorides. Sugar, when present, is usually found in small amount.

With a view to determining whether spirochaetes were present in the cerebro-spinal fluid, the authors carried out animal inoculations. The results were positive, and it was the opinion of the authors that this fluid is even more toxic for guinea-pigs than is the blood. The first of the above papers gives in detail the results of the chemical examination of the cerebro-spinal fluid from several cases of this disease and should be referred to by those interested in this work.

R. P. C.

Garnier (Marcel) & Reilly (J.). **La recherche du spirochète ictérigène dans l'urine de l'homme et du cobaye.**—*C. R. Soc. Biol* 1917. Jan. 6. Vol. 80. No. 1. pp. 38–41. With 5 figs.

Garnier and Reilly recommend the centrifuging of the urine and the employment of the Chinese ink method in the search for spirochaetes in spirochaetosis ictero-haemorrhagica.

They state that this method has been very successful in their hands and that it is especially valuable in light infections.

R. P. C.

Krumbein (R.) & Frieling (B.). **Zur Weilschen Krankheit.**—*Deut. Med. Woch.* 1916. May 11. Vol. 42. No. 19. pp. 564–566.

An account of two cases of Weil's disease in man associated, in each case, with a similar disease in dogs with which they had been in contact. The writers draw the following conclusions from their notes and observations :—

1. That dogs suffer from a disease similar to Weil's disease in man ; and that the infection of man may result from contact with such infected animals.
2. That indirect infection, through the medium of the dog-flea or gnats, is probable.
3. That the incubation period of the disease in man is a long one—three weeks.

Their treatment of the cases was " purely symptomatic " and consisted mainly of copious administrations of normal saline solution, either intravenously or subcutaneously.

A footnote to the article records a further case in which the patient was found to be heavily infested with crab lice. The authors suggest that these vermin may possibly play a part in the transmission of the disease.

R. P. C.

Costa (S.) & Troisier (J.). **Sur la Spirochétose ictéro-hémorragique.** —*C. R. Soc. Biol.* 1916. Dec. 2. Vol. 79. No. 19. pp. 1038–1042.

The authors have performed a number of experiments on guinea-pigs with the cerebro-spinal fluid of patients suffering from different forms of ictero-haemorrhagic spirochaetosis. Two guinea-pigs were inoculated from each of the four patients studied. Of these patients, two presented clinical features of the classical form at the time when the animals were inoculated ; the third showed meningeal symptoms, while in the fourth case, the cerebro-spinal fluid was taken at the time of a relapse. In each case, 7 cc. to 10 cc. of the cerebro-spinal fluid was used for inoculation. In the first three cases, where the fluid was taken at the commencement of the illness, the guinea-pigs showed typical symptoms of infectious jaundice, and five out of the six contracted the malady, the sixth animal dying of shock. The cerebro-spinal fluid was thus shown to be virulent, even more so than the blood. In the fourth case, where the inoculation material was taken at a relapse, the incubation period was lengthy, but the animal became infected, and afterwards the inoculation of its urine to another guinea-pig proved fatal to the latter, which died after a typical illness. Two other cases in which material from relapses was used were negative. The cerebro-spinal fluid, then, was found to be infective at the period of relapse, and the existence of meningitis in infectious jaundice is demonstrated.

The syphilis fixation reaction in ictero-haemorrhagic spirochaetosis was also studied, tests being made by the rapid method of Hecht-Bauer and by the classic method of Bordet-Gengou. Five patients

were so tested, none of whom had had syphilis. In two tests made with serum at convalescence positive results were obtained; negative results accrued in two cases tested after cure, while one test after cure gave a feeble positive result; one case was nullified by the absence of complement. These results were obtained by the rapid method. There were five positive and two negative results by the classic method. The syphilis fixation reaction seemed fairly frequent in cases of infectious jaundice.

The passage of the virus of infectious jaundice through the placenta of guinea-pigs was established. A pregnant female was inoculated with blood and urine from an infected dead guinea-pig. It died, and the amniotic fluid around a foetus was inoculated to another animal. The second animal died and intense jaundice was present at autopsy, while numerous spirochaetes were found in the liver.

In a discussion, PETTIT stated that he and MARTIN had produced a curative serum in a horse, which was effective for guinea-pigs, which serum he thought could be used in treating men.

A. P.

COSTA (S.) & TROISIER (J.). **Mort du lapin et survie du cobaye dans la spirochétose ictérohémorragique expérimentale.**—*C. R. Soc. Biol.* 1917. Jan. 6. Vol. 80. No. 1. pp. 27–28.

The appearance of jaundice in guinea-pigs, inoculated with material from patients suspected to be suffering from spirochaetosis icterohaemorrhagica, is held by the authors to be of sufficient value to justify the diagnosis being made.

They find that animals inoculated with the disease do not invariably succumb and that the recovery of the animal does not necessarily preclude the presence of the infection in the patient.

R. P. C.

GARNIER (Marcel) & REILLY (J.). **La recherche des substances immunisantes chez les convalescents de spirochétose ictérigène.**—*C. R. Soc. Biol.* 1917. Jan. 20. Vol. 80. No. 2. pp. 101–103.

The blood serum of patients convalescing from severe attacks of spirochaetosis ictero-haemorrhagica is found by Garnier and Reilly to be richer in immune bodies than is the serum from those patients who have passed through a milder form of the disease.

By their experimental work on guinea-pigs, they were able to demonstrate that the protective value of the former serum, against the virus of the disease, was high, whilst the later cases yielded a serum which had little, or no, protective value.

In consequence of this low protective value, the writers consider that this test alone would lead to confusion with other forms of jaundice, and they suggest that diagnosis should not be based on it but that examination for the specific organism in the urine should in all cases be made.

R. P. C.

Garnier (Marcel) & Reilly (J.). **Action de la bile sur la virulence de *Spirochaeta icterohemorragiae*.**—*C. R. Soc. Biol.* 1917. Jan. 6. Vol. 80. No. 1. pp. 41–42.

These observers find that the addition of ox-bile to an emulsion of the liver of a guinea-pig, which had succumbed to *S. icterohemorragiae* infection, renders the emulsion innocuous when injected into a healthy animal. The amount of ox-bile added was 1 cc.

A similar result was obtained by the addition of 1 cc. of a 1 in 1,100 solution of either taurocholate or glycocholate of soda to a virulent emulsion. In this connection, they point out that, in the course of the disease in man, as the jaundice becomes gradually more marked the temperature progressively falls. This phenomenon they attribute to the anti-spirochaete action of the bile salts.

Immunity against the spirochaetes is not, however, acquired until a later period, and is due to the formation of definite immune bodies in the serum.

R. P. C.

Martin (Louis), Pettit (Auguste) & Vaudremer (Albert). **Coloration du Spirochète de l'ictère hémorragique par les méthodes de Löffler et de van Ermenghen. Présence de cils.**—*C. R. Soc. Biol.* 1916. Dec. 2. Vol. 79. No. 19. pp. 1053–1055. With 1 plate.

Examination of cultures of the spirochaete of infectious jaundice by means of the ultra-microscope being somewhat difficult on account of pseudo-spirilla in the blood, the authors have devised a method of differential colouration, using Löffler's stain for cilia and that of van Ermenghen. The autopsy of an infected guinea-pig must be made within six hours of death. The liver is ground up and diluted with salt solution. It is filtered and the filtrate centrifuged for ten minutes. Decant and add more saline. Centrifuge anew for five minutes. If the liquid is still cloudy, renew the operation. Make thin smears, dry, and stain with Löffler or van Ermenghen's solutions. In using the latter stain, use dilute alkaline aniline gentian violet instead of Ziehl's stain.

The spirochaete was found to measure about 9$\mu$ long and 1·5$\mu$ broad. The technique is responsible for the relatively great width. The body shows alternate light and dark areas, but is somewhat straightened after this procedure. The extremities of the spirochaete are stated to be furnished with cilia (or flagella of English authors). One of the cilia is stated to be nearly half the length of the body, the other is shorter and more rigid.

[It is obvious from the technique that maceration must occur, and this probably accounts for the cilia or flagella at the ends of the body. The micro-photographs, stated to show these structures, are rather indistinct.]

A. Porter.

## MISCELLANEOUS.

Macdonald (Angus). **Notes on Blood-Sucking Flies in Grenada.**—*Bull. Entom. Res.* 1917. Jan. Vol. 7. Pt. 3. pp. 259–264. With 2 plates.

Grenada is a mountainous volcanic island, about half the size of Middlesex; it has an equable damp climate with an average temperature of 80° F.; its chief cultivation is cacao and fruit trees. The only Anopheline found is *A. argyrotarsis* R. D., a recognised malaria carrier in the New World.

"Its permanent habitat in Grenada lies in the shallow moist flats in the neighbourhood of lagoons and estuarine swamps around the coast of the whole Island. Individually these spots are of no great dimensions; many are remote from human habitations, and effort properly directed should be able to abolish the breeding places at little cost.

"The temporary breeding places are unfortunately scattered throughout the Island in intimate contact with the residences of the human population. Chiefly in the wayside gutters along highways and byways, and in hoof-marks, pigwallows, trenches, and flats in grass land and elsewhere are these temporary breeding places to be found."

It loves pools on which the sun shines most of the day and an illustration is given of an exposed river bed with large boulders where larvae were found to swarm after flooding.

*Stegomyia fasciata* is the common domestic mosquito of the towns and villages but is not common in the country districts. Only twice has the author found it about native dwellings in the country and never in empty cacao pods.

*Culex fatigans* is found in wayside pools and ditches, especially if foul, and in cess pits, or their equivalent, flooded with water. "Filariasis in an acute form is not known at present in Grenada."

The rest of the paper deals in an interesting manner with mosquitoes which are not known to convey disease—*Limatus durhami* Theo., *Haemagogus splendens* Will., *Wyeomyia grenadensis* Edw. (a new species), *Megarrhinus haitiensis* D. and K., *Ochlerotatus niger* Giles, and others. *L. durhami* is "perhaps the most ubiquitous mosquito in Grenada"; it breeds usually in old cacao pods. *Janthinosoma neoapicalis* Theo. is found in shallow waters together with *A. argyrotarsis*. A Ceratopogon, the "sand fly" of Grenada, is practically ubiquitous and in moist places swarms. Stomoxys is about as common as in England.

The other photographs show a silk cotton tree with numerous epiphytic "wild pines" in which larvae of five different species of mosquito were found, and an avocado pear and mango with holes, in which species of Wyeomyia and Megarrhinus respectively were found breeding.

A. G. B.

i. Macfie (J. W. Scott). **Notes on the Insects collected at Accra during the Year.**—*Report of the Accra Laboratory.* 1915. pp. 76–79. With 1 plate. London: J. & A. Churchill.

ii. Corson (J. F.). **Entomological and Other Specimens collected in the Northern Territories, chiefly in the Districts of Wa and Lorha.**—*Ibid.* pp. 30–35.

i. Twenty species of mosquitoes were collected, thirteen in the author's bungalow; by far the commonest was *Mansonioides africanus*.

Nine had not previously been recorded for Accra, bringing the total of recognised species to forty-one ; a list of these is given. Those taken in the house must have come from a distance because there was no place in the immediate vicinity in which they could have bred. Photos show where *Anopheles costalis* was found breeding. A complete list of the insects collected is given, as determined at the Imperial Bureau of Entomology.

ii. A list of the insects and helminths is given, the identifications being furnished by Mr. H. F. Carter and Professor J. W. Stephens. The first list, in column, occupies two pages and includes 17 Culicidae and 13 Tabanidae. Previous collections in these districts were made by Dr. J. J. Simpson.

It is noted that nematodes of the genus *Physaloptera* are almost constantly found in the stomach of various species of rat, and that these rats are eaten by the natives. There are also notes on trypanosomes in equines and bovines, haemogregarines in frogs, and a Protozoon (?) observed in the blood of a snake.

A. G. B.

Roubaud (E.). **Les Porcins et la conservation des Ectoparasites humains, dans les régions chaudes.**—*Bull. Soc. Path. Exot.* 1916. Dec. Vol. 9. No. 10. pp. 768–771.

In this interesting paper the author brings together observations, his own and those of others, showing that certain bare-skinned animals in Africa which live in burrows—warthogs and ant-bears—may serve blood-sucking larvae, such as the Congo floor maggot, chigoes, ticks, etc. as substitutes for man. Their skin, like that of man, is almost hairless. Thus the Cheromyia associated with wart-hogs is closely related to the Auchmeromyia associated with man, and the larvae can be reared on either host. Cheromyia is found in native huts as well as in the warthog burrows.

The observations of others are these :—Lloyd in Rhodesia found *Ornithodorus moubata* in warthog burrows far from human habitation [this *Bulletin*, Vol. 8, p. 51] ; Wellman in pigstyes in Angola. Van Saceghem has recently found this tick, unknown to natives of the locality, in pigstyes at Zambi on the lower Congo. Chigoes are well known to be common to both man and the pig ; in Brazil the chigoe is known as " bicho de porco " [see this *Bulletin*, Vol. 9, p. 210]. On the island of Principe the Portuguese Mission showed that the wild pigs formed the chief support of *Glossina palpalis* ; the extermination of the pigs, with other measures, brought about the extermination of the fly. Moiser in Nigeria has pointed to the abundance of warthog in the haunts of *G. tachinoides* [*loc. cit.* Vol. 2, pp. 589–90]. Noeller finds that the pig louse can remain alive for a long time on man, and the clothes louse for seven days on the pig.

It is concluded that as regards the nutrition of ecto-parasites the pig is the nearest animal to man. A list is given of the endoparasites transmissible to man which are harboured by the pig—several species of helminths and *Balantidium coli* ; blood parasites, such as certain trypanosomes, should be added. More observations are wanted on the subject of this paper.

[The following quotations from Lloyd are interesting in this connection :—" It is [in Rhodesia] a very common experience to see

tsetses fly out of a burrow in the ground." "In ten instances they (pupae) were found in the burrows of various animals. . . . These are usually the holes of bushpig or warthog." (*Bulletin of Entomological Research*, 1914. Vol. 5, pp. 55 and 57.)]

Macfie (J. W. Scott). **Morphological Changes observed during the Development of the Larva of** *Stegomyia fasciata*.—*Bull. Entomol. Res.* 1917. Jan. Vol. 7. Pt. 3. pp. 297–307. With 7 text figs.

The larva of *S. fasciata* passes through four distinct phases after it emerges from the egg and before it pupates. These have been studied in the present paper, certain morphological details of each phase being figured. The characters of the four phases are then summarised. The author thinks that for purposes of classification it would be best to deal only with larvae in the last phase, which are always easy to recognize.

A. G. B.

Public Health Reports. 1916. Nov. 17. Vol. 31. No. 46. p. 3159.—**Mosquitoes. An Unusual Breeding Place.**

At La Guaira, Venezuela, in the American consulate, mosquitoes were troublesome though no breeding place could be found. Larvae were eventually discovered in the ice chamber of a water cooler; they were unfortunately thrown away before determination. Thereafter the cooler was attended to and the mosquitoes disappeared.

A. G. B.

Werner (H ). **Beobachtungen über Anophelenvorkommen in der Nähe menschlicher Fäkalien.** [Occurrence of Anopheles near Human Excreta.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1916. Oct. Vol. 20. No. 19. pp. 444–445.

The observation briefly recorded here was made in the spring and summer of 1916 in the swamps of White Russia. Anopheles were found to congregate in the latrines. The Culex, which were found in great quantity, did not. Often the Anopheles were not to be found elsewhere. It is suggested that they were attracted by the faecal smell. The species is not named.

A. G. B.

Macfie (J. W. Scott). **The Limitations of Kerosene as a Larvicide, with Some Observations on the Cutaneous Respiration of Mosquito Larvae.**—*Bull. Entomol. Res.* 1917. Jan. Vol. 7. Pt. 3. pp. 277–295. With 1 text fig.

The author points out some of the limitations of oiling as a measure to banish mosquitoes from towns and stations; e.g., at Accra it is difficult to maintain an unbroken surface of oil owing to wind, which drives the oil to one side, and to the sun which causes rapid evaporation; moreover, the mosquitoes, commonly caught in houses do not correspond to the larvae found in the compounds [see this *Bulletin*, Vol. 9, p. 99], but are species of Mansonioides which have bred at a distance, perhaps a mile away. It is, too, impossible to oil the lagoons owing to their

size and situation and here a species of Culex often found in Accra houses breeds freely; it can (in a laboratory experiment) live submerged for many days. He goes on to discuss the mode of action of kerosene as a larvicide. The suggested modes are, annulling the surface tension of the water, depriving the larvae of access to air, and a poisonous action. As a result of some experiments Macfie thinks that the third suggestion is the correct one.

The different periods of survival of the larvae in different experiments led him to study the oxygen requirements of submerged mosquito larvae. The larvae were confined singly in small tubes holding about 8 cc. of fluid, the surface being covered with a layer of melted paraffin one cm. deep. The factors determining survival were the species of mosquito: *S. fasciata* survived longer than two other species used; the age of the larvae: young larvae survive longer than fully-developed ones; the temperature: a lowering of the temperature prolongs and a raising of it shortens the period of survival of submerged *S. fasciata* larvae; the presence of organic matter in the medium: this materially shortens the period of survival, and the cause probably is the smaller quantity of dissolved oxygen; the presence of water weeds. These factors are so various that it is practically impossible to arrange a satisfactory series of experiments.

The part played by cutaneous respiration is next discussed, and the proportion of the dissolved oxygen available. The survival of larvae submerged in slowly running water was studied by means of an apparatus which is figured. Here larvae of *S. fasciata* lived in comfort up to the stage of pupation, often more than 20 days. It is concluded that, as stated by Sen, they respire the oxygen of the air dissolved in water. The practical bearing is that larvae may escape the action of any injurious substance on the surface. Finally, the results of oiling with crude kerosene as observed in laboratory experiments on various species of mosquitoes are given.

A. G. B.

Macfie (J. W. Scott). **Chlorine as a Larvicide.**—*Report of the Accra Laboratory.* 1915. p. 71: London: J. & A. Churchill.

In view of the fact that minute traces of chlorine render even highly polluted water safe for drinking purposes Dr. Macfie thought it desirable to find out in what proportion the gas must be present to kill mosquito larvae. *Stegomyia fasciata* larvae, in tap water or their natural medium, were unaffected by chlorine in proportion of 1 in 500,000, 1 in 250,000, 1 in 50,000, and 1 in 25,000. In 1 in 10,000 all were dead within 24 hours. The conclusion is that chlorine has no special application as a larvicide. The water was chlorinated by Harper Nelson's method.

A. G. B.

Sadi de Buen. **Los mosquitos del genera "Phlebotomus". Su interés medico.** [The Flies of the Genus Phlebotomus. Their Medical Importance.]—*Siglo Med.* 1916. Oct. 28. Vol. 63. No. 3281. pp. 695–696. With 1 text fig.

A short note, with an illustration of the insect, drawing the attention of Spanish practitioners to the importance of Phlebotomus as a pro-

pagator of three day or pappataci fever. Doerr, Taussig and Franz have shown that the insect is not merely a mechanical transmitter of the virus, but that an incubation period of a week within the body of the insect is necessary. Townsend has emitted the opinion that a species of Phlebotomus is the transmissor of verruga ; Sergent and others, again, have suggested that the leishmaniasis of Oriental sore is transmitted by a Phlebotomus, the reservoir being the gecko (*Platydactylus mauritanicus*). Medical practitioners in Spain should therefore note that Oriental sore is common on the African coast of the Mediterranean, that flies of the genus Phlebotomus have been recognised in Granada, Malaga, and Palma de Mallorca in Spain and that the gecko, vulgarly termed " drago " in Catalonia and the Balearic Islands, is found practically all over Spain. Phlebotomus has also been taken by Pittaluga in Spanish Guinea.

J. B. Nias.

Swellengrebel (N. H.). **Quelques remarques sur la façon de combattre le pou des vêtements.**—*Arch. Néerland. des Sci. Exact. et Nat.* 1916. Vol. 3. Ser. 3 B. pp. 1–31. With 1 plate & 23 text figs.

A French version of a Dutch paper briefly reviewed in this *Bulletin*, Vol. 7, p. 193. As it contains several observations of interest it is deemed worthy of a further notice. Dr. Swellengrebel finds a want of precision in the majority of the works which treat of the destruction of lice, and notes especially that it is often assumed on quite insufficient evidence that the eggs have been destroyed. He finds fault also with the technique of some of the observers. His own experiments were made in the laboratory at Amsterdam.

Some of his remarks on the biology of the clothes louse are of interest. He notes that the larva when it emerges from the egg is invisible on the skin to the naked eye, but that it is then extremely active ; hence it may play an important part in the spread of the lice pest. The irritation caused by the louse bite was in his case very slight and disappeared in an hour. If however he squashed a biting louse there was redness, oedema, and itching, followed by superficial necrosis of the skin, so that the place was visible a fortnight later. When the bite is unexpected, one scratches involuntarily with the above named results. As illustrating the tenacity of life of the eggs he states that if a female dies containing fertilised eggs these may develop into the intra-ovular larval stage even when the body of the mother has been bleached for some days in peroxide of hydrogen solution, washed for hours in alcohol, and then immersed in glycerin.

He comments on the ease with which lice make their way through fissures and cracks, an important fact in the fashioning of garments for protection. In reference to the statement that in German hospitals the beds of typhus patients are surrounded by a gutter containing a pediculicide, in order to prevent the lice from travelling to other beds " as if they were ants," he says that he put lice at intervals varying between 50 cm. from, and quite close to, his arm, but in the latter case only did they approach the skin ; the others stayed where they were till they were found some hours after. On the other hand he was

struck by the rapidity with which they attached themselves to a fragment of rag or wisp of wool and were carried off with it; he attributes to this the infection of so many doctors with typhus. This portion of the memoir is well illustrated.

He goes on to the destruction of the eggs in clothes and on the human body and of the adults on the skin. A rational attempt at destruction of lice must, he says, be aimed at the eggs as being the most resistant forms. In making experiments therefore one must have a certain criterion of death; such is a marked shrivelling of the eggs. A sure method of testing accuracy of results is to attempt to hatch out the treated eggs but at least ten days are necessary, even to the intra-ovular larval stage. The results of experiments are then detailed. They were conducted on a big scale, as would be done in practice in the field, the only departure from actual conditions being that instead of attachment of the eggs to clothes they were placed in glass tubes closed at each end with wool and laid between the clothes. Hence conditions were less favourable than the normal. The tabulated results show that ammonia, developed in an "Autan" apparatus or in Flügge's lamp, was effective, as were also formaldehyde in a Rubner apparatus, hot air at 70° and benzene vapour, but the trials with the last-named methods were less numerous. For the details the paper must be seen. For disinfection where no steam apparatus is available he recommends ammonia, benzene or sulphide of carbon, in a disinfecting chamber which is figured. The pros and cons of each substance are stated.

Substances used successfully for destruction of eggs on the skin, tested by plunging the eggs into them for varying periods, were 3 per cent. creolin, "lotio contra pediculos," and essence of anise with alcohol. He questions the sufficiency of a hot bath.

He experimented on the destruction of the adults on the skin by keeping them and the substance to be tested in separate glass tubes secured near one another in a sleeve worn on the arm next the skin, but it seems probable that the conditions were too rigorous for he found iodoform and naphthalin without effect [cf. Peacock; Kinloch; this *Bulletin*, Vol. 8, p. 383]. He distinguishes between pediculifuges and pediculicides. Efficient pediculifuges were not found. Of pediculicides the essential oils are too volatile, the only exceptions being essence of anise. The results obtained with lausofan (Bayer & Co.) anisol and globol (p. dichlor-benzene) were promising. He doubts whether aromatic substances have much value. Pure acetic acid is excellent but harms the skin.

A. G. B.

Bacot (A.). **A Contribution to the Bionomics of *Pediculus humanus* (*vestimenti*) and *Pediculus capitis*.—*Parasitology*.** 1917. Feb. Vol. 9. No. 9. pp. 228–258. With 4 text-figs.

The summary of this paper, which contains 15 tables of experiments, is as follows:—

"*General comparative note on the two species.*

"*Pediculus humanus* (*vestimenti*) is a larger, more robust and less active insect than *P. capitis*—the ♀♀ having a relatively greater egg-carrying capacity than those of the head louse. The eggs are larger and the number

laid (under the conditions of these experiments) is greater, while the habits associated with egg laying differ, although placing the ♀♀ of *humanus* under conditions applicable to *capitis* or *vice versa* may induce a considerable degree of uniformity. Cross pairings between the insects are easily brought about and the offspring are fertile *inter se*. Hybrid strains were maintained until the F. 3 generation and there seemed no reason, judging from breeding results, why such strains should not be continued indefinitely. Nevertheless the marked disparity in the sexes of the F. 1 generation of some of the crosses between *P. capitis* ♂ and *P. humanus* ♀ suggests that the parents are specificially distinct."* . . .

*Habits.*—The body louse exhibits some of the habits of a gregarious animal especially during the moulting phases, also a preference for returning to the same spot for oviposition, which leads to the clustering of its eggs. These habits are shown, though in a less marked degree, by *P. capitis*, and it is possible therefore that they are to some extent the outcome of confinement. . . .

"A ♂ of *P. humanus* fertilized 18 out of 21 ♀♀ placed with him in succession. Four attempts with *P. capitis* were less successful; one ♂ fertilized ten ♀♀ and very possibly might have equalled the *P. humanus* record but for a scarcity of virgin ♀♀ while the experiment was in progress. The longest period during which a ♀ of *P. humanus* retained the power to lay fertile eggs in the absence of a ♂ was 20 days, usually it would seem to be from 16 to 18 days. In the case of *P. capitis* the period was shorter; 12 days being the longest ascertained period, while it was more usually from seven to eleven days.

"The greatest number of eggs laid by any one ♀ of *P. humanus* was 295, an average of 6·4 per day—the daily average of a number of ♀♀ being 5·1. *P. capitis* ♀♀ showed a lower fecundity, the highest record being 141 with a daily average of 4—the general average being 3·7. These figures are probably exceeded under natural conditions. An experiment in differential feeding with *P. humanus* (Table VIII) shows clearly that fecundity is dependent on feeding. When extra feeding time over and above seven hours per day was given the average for four ♀♀ was eight per day. It is reasonable to suppose that the average for *P. capitis* would also be increased by unrestricted feeding.

"The fertility of the eggs laid was not affected by increased feeding. The greatest number of fertilized eggs laid by a ♀ *P. humanus* after the removal of the ♂ was 115 (♀ No. 9), with a ♀ showing a higher daily laying average this might well be exceeded. With *P. capitis* the parallel figure is 70 (♀ No. 9). The ♀♀ of both species, after arriving at maturity, started oviposition irrespective of their having paired or not, but eggs laid by virgin ♀♀ were invariably infertile.

"*Length of life.* The life of the ♂ *P. humanus* used in the experiment recorded in Table I was 32 days; the longest ♀ life was 46 days, with an average of 34. For *P. capitis* the figures were: ♂ life 30 days; ♀ life 38 days, with an average of 27 days. Whether or not the average lives of the insects would be extended by unrestricted feeding is an open question.

"The life of the hybrid insects was not noticeably shorter than that usual for *P. humanus*, and they seemed to thrive better than *P. capitis*.

"Tests made with *unfed P. humanus* showed that the longest lives were at a medium temperature of 16° to 18° C., many of the insects living from three to four days, while two lived five and one lived seven days. At 24·5° C. all died within five days. At 36·1° C. all died within three days.

"Newly-hatched larvae, unless fed, lived less than 24 hours at 36·1° C., and when kept in a box in the vest pocket they lived but little more than a day; none survived a second day.

"Adults kept in a box in the side pocket of a coat lived five days without food; this was in March." . . .

"*Cold.* Active specimens of *P. humanus* survived two days at a temperature of —2·3° C. to — 1·1° C., but none recovered after exposure to these conditions for a week.

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* Professor Nuttall, in the same number of *Parasitology* (p. 294), writes:—"The head louse and clothes or body louse . . . are identical in all parts of structure and can no longer be regarded as distinct."

"*Hatching of eggs.*—Table IX shows that under humid conditions at 31° C. 3 per cent. of the 1,300 eggs tested hatched on the seventh day; 56 per cent. on the eighth; 33 per cent. on the ninth; 8 per cent. on the 10th and ·2 per cent. later on the same day or on the 11th.

"A test of batches of eggs taken from a stock box, some of which must have been laid several days previously, showed that none hatched at 15·6°–18·4° C., while at 24·5° C. there was considerable egg mortality, and the hatching period was spread over a longer period than usual, though not to the extent mentioned by Warburton (1909); at 36·1° C. hatching was spread over five days and the mortality was not excessive.

"To give some idea of the possible rate of multiplication of *P. humanus* we may estimate the egg period as 12 days and a further 12 days to the maturity of the ♀♀. Allowing an average of eight eggs per day, spread over a fertility period of 40 days, we find that, during her life, a single ♀ may have 4,160 offspring."

The insects were kept in glass-bottomed entomological boxes lined with a loose slip of cloth. The open top was covered with chiffon, the lid being partly closed. The box was nested in one of a larger size. The boxes were inserted in holes punched in pieces of card, by means of which they were maintained in contact with the body during sleep, the insects feeding through the chiffon. By day the boxes were carried in the waistcoat pocket.

A. G. B.

Bodkin (G. E.) & Cleare (L. D.). **Notes on Some Animal Parasites in British Guiana.**—*Bull. Entomol. Res.* 1916. Oct. Vol. 7. Pt. 2. pp. 179–190. With 1 map & 3 text figs.

The authors state that with very few exceptions all the species and observations recorded in this article are the outcome of their own work during the last two and a half years. Many species of parasitic worms have been found in domestic animals, where is "a highly interesting field of almost unlimited scope." A species of Ankylostoma "resembling *A. ceylanicum* Looss" occurs in most dogs. A species of Physaloptera is very common in the stomach of cats and in these animals a species of Dicrocoelium is very prevalent. *Echinorhynchus gigas* is a common inhabitant of the small intestine of pigs. Six species of tick are mentioned, one of which, *Amblyomma cajannense* F., is commonly met with as a parasite of man. The list of Tabanidae includes numerous species. Fleas, bugs, lice and numerous Mallophaga are listed, with remarks. With regard to the climate the authors say: "For those who lead regular lives and do not expose themselves to unnecessary risks the climate is decidedly a healthy one."

A. G. B.

Donaldson (R.) & McLean (R. C.). **Plant Hairs as Pseudo-Parasites.**—*Lancet.* 1916. Dec. 30. pp. 1100–1102. With 1 plate and 3 text figs.

The authors, one of whom is a bacteriologist, the other a botanist, describe a case of diarrhoea from Chili in which the discharges were examined and puzzling bodies, suggestive at first of male ankylostomes, except as to size, were found, which were identified as the grapnel hairs of the common runner bean. They consequently illustrate in this article a large number of plant hairs, remarking that these may form the starting point of appendicular concretions (Shattock, 1916) and some may act as irritants to the alimentary canal.

Of the 26 sorts of plant hairs illustrated, with different magnifications, some are from fruits, others from herbs or cereals.

Three points to which they direct attention in the identification of a hair are :—(1) The number of cells of which it is composed ; (2) the thickness of the wall ; and (3) the characters of the base or point of attachment. Tropical plants which do not possess hairs on the edible parts are, pineapples, bananas, and maize. It is pointed out that only the novice would mistake plant hairs for parasites. [Reference may be made to this *Bulletin*, Vol. 2, p. 627, and Vol. 9, p. 49 , for instances of errors of the kind.]

A. G. B.

Australian Institute of Tropical Medicine. **Half-Yearly Reports from 1st July to 31st December 1914, and from 1st January to 30th June 1915.** 22 pp. 1915; and **from 1st July to 31st December 1915.** 10 pp. 1916. [Director: A. Breinl]. Printed and Published for the Government of the Commonwealth of Australia by Albert J. Mullett, Government Printer for the State of Victoria.

(1) The Director was employed during this period with Dr. Priestley in the investigation of " Mossman fever " [this *Bulletin*, Vol. 6, p. 314]. It was shown that monkeys are susceptible and that the cause is probably either a protozoon or one of the ultra-microscopical group of organisms. Dr. W. J. Young worked at the body temperature, as measured in the rectum, of white people in the tropics, reaching the conclusion that its limits are not materially different from those found in a cool climate [*loc. cit.*, Vol. 7, p. 338]. Dr. Wm. Nicoll examined 13 cases of worm infection, most of which were mixed. In five cases of ankylostomiasis the average number of worms collected was 81 Ancylostoma and 45 Necator. The local animals were systematically examined for parasitic worms ; the results have been set forth in published papers. Observations were made on the growth and development of larval hookworms under different conditions. When the eggs are reared under adverse conditions, e.g., in the presence of salt or putrefying matter, the embryonic development is considerably retarded. " The larvae grew most rapidly on a substratum of well-washed and diluted faeces and may reach their full development within four days." The incidence of worm infection among human beings in this region is stated to be relatively low as compared with that in other tropical countries. Dr. F. H. Taylor writes on the results of mosquito mapping.

(2) In this half year Dr. Breinl was engaged in the investigation of problems connected with beriberi. His experience has led him to regard beriberi as a " place-borne disease " and he sought to confirm McGarrison's work, who found a bacillus of the *suipester* group in pigeons suffering from the beriberi-like disease produced by exclusive feeding on polished rice. The attempt was negative [this *Bulletin*, Vol. 8, p. 466]. An attempt was made to transmit dengue fever to monkeys by blood inoculation ; in six experiments the monkeys failed to react. Arneth counts were made on blood films from New Guinea natives [*loc. cit.*, Vol. 7, p. 336]. Forty-five patients were admitted

to hospital with dengue in this half-year. Dr. YOUNG pursued investigations into the constituents of the urine of white people living in the tropics and studied the mechanism of the action of organic arsenic compounds in the treatment of certain protozoan diseases. Dr. NICOLL continued his experimental work on worm nodule disease and on the larval development of the hookworm. Dr. PRIESTLEY accompanied the Ophthalmic Inspector of Schools for Queensland on a tour to investigate the eye diseases among children in the west. It was doubtful whether the trachoma of Queensland was real trachoma or a disease resembling it. In many cases the scrapings from the conjunctiva were found to contain "trachoma bodies." It was concluded that "true trachoma does exist and is very prevalent in Western Queensland, but that it is of relatively very mild type."

(3) In this half year Dr. Breinl spent about two months travelling through part of the Northern Territory with the Chief Health Officer, visiting the Melville and Bathurst Islands and the Daly and Alligator Rivers. Whereas in the older settled districts malaria is prevalent, no sign of it could be detected among the natives of the above-named rivers and 250 natives of the islands were examined with a negative result. This confirms Breinl's previous conception that malaria is not endemic among these natives. Other diseases seen were, yaws, gangosa, a disease resembling acne, tropical ulcer and ulcus interdigitale destruens [this *Bulletin*, Vol. 6, p. 132]. Syphilis and tuberculosis, probably introduced, had a wide distribution. On the whole the health of the wild natives was excellent. With Dr. PRIESTLEY the tartar emetic treatment of ulcerative granuloma was tested. Hitherto this disease, prevalent among the aboriginal population, had been considered incurable. The results obtained in the one case were very encouraging. In two months "about 52" cases of typhoid were admitted to the tropical ward—a relatively large number of children and women. All were found to be due to *B. typhosus*; none to paratyphoid. Details will be published. Dr. NICOLL studied the system of night-soil disposal. It appeared to be satisfactory "not only in disposing of the excreta but also in preventing the development and spread of hookworm larvae." Dr. PRIESTLEY investigated the mechanism of the agglutination reaction, with results which are set forth.

A. G. B.

NIGERIA. **Annual Report, 1915, Medical Research Institute.** [CONNAL (A.) & COGHILL (H. Sinclair).]—29 pp. 1916. London: Crown Agents for the Colonies. [Price 2*s.* 6*d.*].

In the introductory paragraph to this Report it is stated that special attention has been directed to ankylostomiasis, babesiasis, blood-sucking flies, dysentery, skin diseases and trypanosomiasis. A tabular statement shows that of a total of 1,088 natives examined by different medical officers in the Southern Provinces 52 per cent. harboured ankylostomes. The inmates and staff of the Yaba Lunatic Asylum (all natives) and the native staff of the Institute were examined with care—136 persons. "Negative results were not accepted until five smears from each of three separate stools chosen at weekly intervals had

been searched." Ankylostome ova were found in 133 or nearly 98 per cent. Two or more stools had to be examined in only nine cases. Eighty-eight subjects were divided into four unequal batches and treated in various ways with thymol. " Twenty-two out of 85 were apparently cured, and the highest percentage of these occurred in the group which received twice daily [10 grain] doses of the drug over a long period [35 days."] From the comparative absence of symptoms it is inferred that the cases treated were carriers rather than sufferers from the infection.

Of blood-sucking insects caught and identified 320 were dissected; smears were made of the proboscis, cephalic muscles, thoracic muscles, and intestinal tract. The results do not lend themsleves to summary. An account is given of the blood and other findings in two lepers treated with salvarsan. Details are furnished of the cultivation of the parasites from a case of subtertian malaria. From a case resembling Pyosis mansoni a Gram-positive diplococcus was isolated; its cultural characters are set down.

A collection of blood and gland juice smears obtained by Dr. H. A. Foy from natives on the Benue River was examined. *T. gambiense* was found in 17 instances. Of dried smears from 168 cattle examined [type and provenance not stated] 29 per cent. showed trypanosomes, mostly resembling *T. vivax.*

A second section of the Report deals with Clinical Material. Four cultures from faeces and urine proved to be *B. typhosus* (two) and *B. paratyphosus* A (one).

Mosquito larvae were received for identification almost every day throughout the year. An account is given of the species, and the numbers of each, received in each month, of the way in which the larvae were associated, and of the receptacles wherein they were found; the data are set out in two tables. During the year *Stegomyia fasciata* formed 62·5 per cent. and *Anopheles costalis* 7·6. *Culiciomyia nebulosa* was intermediate; from data given earlier in this report it is considered that this mosquito " prefers avian to mammalian blood." The most frequent association of larval species was between *C. nebulosa* and *S. fasciata. Culex fatigans* was determined only five times.

[The last Report from this Institute was summarised in this *Bulletin,* Vol. 8, p. 214.]

A. G. B.

Accra. **Report of the Accra Laboratory for the Year 1915.** [J. W. Scott Macfie, Pathologist].—101 pp. With 6 plates. London: J. & A. Churchill.

Of this Report twenty pages are occupied by an account of the routine examinations made during the year and the remainder by 16 papers on special investigations by medical officers in the Gold Coast—an innovation to which Dr. Scott Macfie refers in his Introduction. During the second half of the year Dr. S. L. Brohier was in charge of the laboratory. The account of the routine examinations does not contain much that is of general interest. It is noted that " several of the [blood] films from natives showed parasites of the type for which Professor Stephens has proposed the name *P. tenue.* In the same

specimens other parasites resembling those of malignant tertian malaria, or actually crescents, were found ; and for this reason these cases have been included under the heading *P. falciparum.*"

In respect of differential leucocyte counts " it cannot be too strongly insisted upon that in the tropics the percentages given as the standard for the healthy European in Europe do not hold good. In particular the low percentage of polymorphonuclear leucocytes in both Europeans and natives in the tropics must be remembered in interpreting the significance of a differential leucocyte count." From 60 to 75 in Europe the percentage of polynuclears is between 50 and 60 in the Philippines. In West Africa it is 58·5 in Europeans (Connal, 181 examinations) and 44·86 among natives (Connal, 722 adults). [cf. Breinl and Priestley, this *Bulletin*, Vol. 7, p. 336].

Of 17 specimens of faeces from Europeans and 15 from natives *E. histolytica* was found in seven of the first and one of the second. Attention is drawn to the heavy trypanosome infection of hump-backed cattle slaughtered at Accra ; of 48 examined 45 were thus infected ; as is pointed out, their introduction cannot but be a menace to the lives of domestic animals bred in the immediate neighbourhood. A number of tables are furnished in this part of the Report. A positive Widal reaction was obtained with the serum of four European cases [no details].

The papers on special investigations will be dealt with elsewhere in this *Bulletin.* The plates illustrate various protozoa (stained and unstained), two mules suffering from trypanosomiasis, breeding places of mosquitoes, a fungus found infecting *G. palpalis* and a case of sarcoma of the orbit.

A. G. B.

Weston (T. A.). **Report on 170 Cases operated upon under Spinal Anaesthesia.**—*Brit. Med. Jl.* 1916. Dec. 9. pp. 794–795.

Captain Weston, R.A.M.C. was surgical specialist at Lucknow. His cases were as follows :—

| | | | |
|---|---|---|---|
| Hernia .. .. .. | 28 | Varicose veins .. .. | 11 |
| Appendicectomy .. .. | 23 | Hydrocele .. .. .. | 8 |
| Varicocele .. .. .. | 20 | Aneurysm of popliteal artery | 1 |
| Haemorrhoids .. .. | 19 | Amputation of thigh .. | 1 |
| Circumcision .. .. | 14 | Wheelhouse .. .. .. | 1 |
| Removal of loose cartilage. | 11 | Salpingitis .. .. .. | 1 |

The majority were British soldiers. Barker's stovaine-glucose solution was used. The anaesthesia, which usually reached the nipple line, was complete on an average in $3\frac{1}{4}$ minutes and lasted 50–60 minutes. There were no serious after effects. Slight dyspnoea disappears if the head and shoulders are raised somewhat. To prevent headache, move the patient with extreme care. The advantages are, perfect relaxation, portability of apparatus, and diminishment of shock and respiratory disturbance. Patients who have had spinal and general anaesthesia prefer spinal. The disadvantages disappear with experience, except the main one—that operation can be performed only on parts of the body below the nipple line. [For recent papers on this subject see this *Bulletin*, Vol. 6, pp. 421–2.]

A. G. B.

Huff (E. P.). **Strychnin-Stovain Spinal Anaesthesia, A Visit to the Clinic of Dr. Thoma Ionnescu, Bucharest, Roumania.**—*U. S. Nav. Med. Bull.* 1917. Jan. Vol. 11. No. 1. pp. 34–44.

Strychnine-stovaine is the only anaesthetic employed in the chief hospital at Bucharest and not a single death has occurred as a result of its administration in a series of over 10,000 operations performed by Dr. Ionnescu and his assistants. An account is given of the technique and a translation of Ionnescu's latest monograph of the method, as applied to the special needs of military surgery in the field. This is most detailed and cannot be summarised. The injections are either mediocervical, upper dorsal, dorsolumbar, or lower lumbar according to the point where the needle enters, and the effect required. [This method should be of special value to the single-handed practitioner in the tropics.]

A. G. B.

Reinhard (P.). **Die radiologische Untersuchung tropischer Leberer-krankungen.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1916. Oct. Vol. 20. No. 20. pp. 455–466. With 3 plates.

This paper is one for the expert. The 12 photographs comprised in the three plates illustrate the normal liver, alterations in the position of the liver compatible with health, the " classical form " of liver abscess and the same when the stomach is blown up by means of an effervescing powder, hepatic carcinoma, etc. Changes in the position or size of the liver due to other diseases contracted in the tropics are also discussed. Thirty-three references are given, nearly all German with the exception of papers by Béclère.

A. G. B.

de Paula Santos (A.). **Cholesterinemia no sôro dos impaludados e ancylostomoticos. (Nota prévia).** [Cholesterin in the Blood-Serum of Patients suffering from Malaria or Ankylostomiasis. Preliminary Note.]—*Ann. Paulist. Med. e Cirurg.* 1916. Sept. Vol. 7. Year 4. No. 3. pp. 58–61.

The author, in collaboration with Dr. R. M. da Silva, communicates a method of estimating the amount of cholesterin in the blood-serum of patients suffering from malaria or ankylostomiasis. The procedure is that of Grigaut as modified by Professor Alfredo de Andrade of the medical faculty of Rio de Janeiro. Grigaut estimates that the normal amount of cholesterin in human blood-serum is 1·5 per mille, but the authors have found that the standard should be 1 per mille only.

In malaria and in ankylostomiasis the amount of cholesterin present in the blood is much inferior to the normal 1 per 1,000. In 20 cases of ankylostomiasis not complicated with dropsy (which would affect the result) the average was 60 per cent. of the normal, and in 15 cases of malaria 43 per cent. In five cases of combined malaria and ankylostomiasis the proportion was reduced to 16 per cent.

J. B. N.

DA MATTA (A. A.). **Yodoterapia y salicilo-yodoterapia endovenosa.** [The Intravenous Employment of Iodides and Salicylates.] *Gac. Med. de Caracas.* 1916. Dec. 31. Vol. 23. No. 24. pp. 185–187.

The author speaks in laudatory terms of the endovenous injection of large doses of iodides, as practised by KLEMPERER, and of salicylates, according to the method employed by COMSTOCK. The dose of iodide, in a 10 per cent. solution, should begin with 5 grammes and go up to 15 grammes, it being unnecessary to go beyond. The author has published cases of tropical bubo treated very satisfactorily by this method. The dose of salicylate for arthritic manifestations should also be from 5 to 15 or 20 grammes, given in a similar way in a 10 per cent. solution, or the dose of salicylate may be limited to 5 or 10 grammes, which is then followed by the injection of a similar dose of iodide of sodium in 10 per cent. solution. From 20 to 30 cc. of physiological salt solution should be injected through the needle between the two solutions though for what purpose the author does not clearly say. The injections are to be given at intervals of two to four days. The results are surprising in cases of acute articular rheumatism, four of the author's cases having been able to leave their beds within 24 hours. In chronic rheumatic arthritis and chronic gout the treatment only gives relief, but is nevertheless well worth trying. The drawbacks to the treatment consist of nothing more serious than transient headache, temporary intestinal troubles or possibly palpitation.

J. B. N.

HUNTEMUELLER. **Seuchen und Seuchenbekämpfung in Jerusalem.** [Disease and Disease Prevention in Jerusalem.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1916. Vol. 81. pp. 311–318.

Our recent knowledge of the diseases of Jerusalem, and Palestine in general, we owe to MASTERMAN and to MUEHLENS [see this *Bulletin*, Vol. 2, pp. 106 and 153 ; Vol. 4, p. 410]. The chief "tropical diseases" are, malaria (by far the most important), blackwater fever, typhus, enteric and, on the coast, dengue and oriental sore. The present paper does not add materially to our information. The author went to Jerusalem in January 1913 to start an antirabies department of the "International Health Bureau" ; he left in July. On his arrival the malaria season—July to November—was over. He confirmed MUEHLENS in finding that the parasites of aestivo-autumnal fever diminish in the winter in comparison with the tertian and quartan forms ; he gives percentages but not the figures on which they are calculated. As is well known, in Jerusalem itself the anopheles breed in the cisterns wherein the water supply of the city is stored. Typhoid occurs at Jerusalem and appears to be very mild. The author saw many cases of a similar disease which he was unable to diagnose by bacteriological methods. The symptoms are detailed. In three cases a Gram-negative bacillus was grown from the stools and urine and in one of these from the blood ; Drigalski agar was turned blue. He thinks they may have been typhus, though the clinical picture in the cases seen by MASTERMAN was different.

Other diseases seen were tuberculosis, cerebrospinal meningitis, dysentery (one Flexner and three amoebic). Bilharzia eggs were

found in the urine of four patients, two of whom had never left Palestine. Rabies is widely spread in Palestine; the animals affected are chiefly cats. Twenty-eight cases of persons bitten were under treatment when the author left. Trachoma also is widely spread. The author thinks that there are a number of other diseases, of unknown causation.

A. G. B.

Johnson (Howard H.) & Murphy (John A.). **The Toxic Effect of Emetine Hydrochloride.**—*Milit. Surgeon.* 1917. Jan. Vol. 40. No. 1. pp. 58–70.

This is a useful contribution to our knowledge of the dangers in emetine administration. The drug has been used in 142 cases of entamoebic dysentery at an Army Base Hospital in Texas. Two men died "from peculiar and unusual conditions in no way connected with the disease from which they suffered," and five other cases showed signs and symptoms attributed to the emetine. After numerous references to the literature of emetine and its administration and to works on physiology the authors come to their cases.

Case No. 1, aet. 22, admitted August 2nd with entamoebic dysentery; received emetine, August 10–19, gr. 9; August 21–24, gr. 3; September 5–15, gr. 10; September 27–October 3, gr. 3—a total of 25 grains. September 23rd, pulse showed irregularity; October 3rd, pulse rapid, motor weakness and nervousness. October 4th, marked dysphagia, motor weakness manifested by falling forward of the head, irregularity of pulse and, later, extreme acceleration, evidence of congestion at base of both lungs. Died October 5th. Autopsy showed acute atypical lobar pneumonia, lower lobes of both lungs, and septic bronchitis. Last positive examination for amoebae was September 15th.

Case No. 2, aet. 38, admitted September 5th with recurrent entamoebic dysentery. Treatment, first course ½ gr. doses of emetine twice daily for 12½ days; second course ½ gr. daily for 14 days, increased by ½ gr. daily for four days owing to a positive amoebic stool; a total of 23½ grains. October 12th, complained of exhaustion and weakness, unable to hold head upright, difficulty in swallowing with food regurgitation, muscular tremor; October 17th, congestion of lower and middle right lobes, dyspnoea, extreme cardiac distress; October 18th, death. Autopsy showed dilatation and fatty degeneration of right heart, atypical lobar pneumonia, septic bronchitis.

Case No. 3. Acute entamoebic dysentery, received gr. ½ hypodermically twice a day for ten days. Stools remaining positive, dose was reduced to gr. ½ daily continued for 16 days; total 18 grains. On the 22nd day there was weakness, exhaustion and general nervousness, and coarse muscular tremor. On the 24th day weakness of muscle of the neck, so that the head could not be held long in the erect position. There was also irritative diarrhoea and slight acceleration and variation in the pulse rate. Emetine was discontinued on the 26th day and two weeks later patient returned to duty.

Case No. 5. acute entamoebic dysentery, received 23⅔ gr. of emetine in 28 days; 23rd day, muscular weakness and increased pulse rate; 28th day, diarrhoea, marked variations in pulse rate, extreme physical exhaustion, lolling of head, coarse muscular tremor.

Two other cases showed similar but less severe symptoms. Case No. 6 had pains in the limbs which clinically were due to neuritis. In cases 1 and 2 attention is drawn to the "vagus effect," vagus section being followed, according to the physiologists, by (1) inability to swallow after food has reached the oesophagus, (2) hepatisation of the lungs, (3) rapid and uncontrolled action of the heart.

The present method of giving emetine in the authors' hospital is as follows :—$\frac{1}{3}$ grain daily, increasing $\frac{1}{3}$ per day till 1 grain is given, continued till 8 grains have been given. Bismuth subnitrate is taken at the same time "in large doses." For the succeeding 10 days colonic irrigations of 1–1000 quinine solution once or twice daily. If the stool is still positive 1 gr. emetine is given daily for three days, by which time the patient has had 11 grains. A third course may be given at a later period if required, if there is no asthenia or other contra-indication.

An account of some animal experiments done by Dr. C. P. McCord is added.

[A case of emetine poisoning similar to these is described in this *Bulletin*, Vol. 7, p. 237.]

A. G. B.

Dalimier (R.). **La toxicité du chlorhydrate d'émétine.**—*Presse Méd.* 1917. Jan. 18. Vol. 25. No. 4. pp. 33–35.

The work described here was done in May-June, 1914. Its publication has been delayed. The author used a "very pure" hydrochloride of emetine coming from the firm of Schuchardt of Goerlitz. He experimented with rabbits and guinea-pigs and gives a table showing the lethal doses for these species after intravenous and subcutaneous administration of the drug; it was some fifteen times more toxic by the venous than by the skin route. He has no data of his own about emetine poisoning in man but gives details of a case recorded by Spehl and Colard.

**A man of 28 with amoebic dysentery received for six days two subcutaneous injections daily of 0·03 gm. and then for 12 days the same amount three times a day, or 1·44 gm. in 18 days. There followed, flaccid paresis of all the muscles and especially of the neck, with failure to hold up the head; troubles with deglutition, mastication and speech; oedema of the face, marked diminution of the cutaneous and tendinous reflexes, and rapid and feeble heart's action. The urea and chlorides of the urine diminished. With cessation of emetine and appropriate remedies the toxic symptoms a fortnight later abated.**

The author thinks that a dosage of one gramme represents the maximum for safety and that signs of poisoning should then be looked for.

A. G. B.

i. Funk (Casimir). **The Vitamines, their Chemical Nature, their Importance in Metabolism and their Function in the Animal Organism.**—*Amer. Med.* 1916. Nov. Vol. 22. No. 11. pp. 751–756.

ii. Williams (Robert R.). **Some General Aspects of the "Vitamine" Problem.**—*Ibid.* pp. 756–762.

These papers should be read by all who are interested in "deficiency diseases." It is not intended here to summarise their contents but to note some points of interest. Funk has confirmed Seidell's results on the value of Lloyd's reagent (hydrated aluminium silicate) for the separation of vitamine from autolysed yeast [see this *Bulletin*, Vol. 7, p. 378.] He draws attention to the fact that "actual experiments have demonstrated that in the absence of deficiency of vitamines the

entire metabolism of organic and inorganic constituents goes wrong" ; up to a recent date this factor has not been taken into account. The phosphorus and calcium metabolism are instanced.

Many will agree with Williams when he writes,

"it must be confessed that the contributions to dietary deficiencies which have been made in large volume during the past three years have not been such as to impress one with the simplicity of the subject as a whole, or the adequacy of our present conceptions. In fact our knowledge appears to be more confused and the ultimate solution more distant and obscure than it did three years ago."

He regards the "specific deficiency idea" first put forward by FUNK as "a habit of thought" rather than a "well founded theory." The greater part of his paper is taken up by an account of the clinical and pathological evidence, on the one hand, and the chemical, on the other, against the specificity of the vitamines. He writes :—

"Little and others have shown that white wheat flour produces human beriberi and yet white wheat flour and fat pork are regarded as typical producers of scurvy. Further, although pigeons will maintain full weight and apparent health on whole oats or wheat, guinea-pigs and rabbits develop a scorbutic condition and die. Moreover, McCollum and his co-workers have shown that in contrast to fowls, swine fed on whole wheat develop beriberi-like symptoms which cannot be corrected by the addition of what have been regarded efficient anti-beriberic food stuffs. Moore has described a high incidence of beriberi-like disease amongst swine fed largely on rice polish and with much reason has attributed the disease to the diet. If he is correct we are faced with the fact that the very material which has been most successfully used as a prophylactic against human beriberi in the Orient is the cause of beriberi in swine in Canada. Rommel and Vedder have also called attention to the close resemblance in pathology between cotton-seed poisoning in swine and human beriberi."*

With regard to the chemical side "it has been found possible to effect substantial relief of the paralysis of polyneuritic pigeons with a number of compounds of very diverse composition." After naming some of them he continues, "it would be difficult to imagine a series of compounds of greater diversity which would still possess any chemical resemblance whatever to one another." There are however certain points of resemblance.

"In all of these substances which have been carefully studied the physiological properties are evanescent and automatically disappear when the compounds are kept a few minutes, days or weeks, as the case may be, in a solid state or in pure water solutions," and in some cases the loss of curative power in the solid state is attended by striking changes of crystal form. In one instance at least this change is due to isomerisation, as is illustrated by graphic formulae of two forms of hydroxy pyridine. Certain features of chemical structure which these antineuritic compounds have in common are mentioned. All those known are unstable. Their transformation into stable substances is always attended by a liberation of free chemical energy, which may have something to do with the physiological action.

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* Do not these observations suggest also that caution should be used in arguing from a clinically allied condition in the lower animals to beri-beri in man? Would it not be preferable to eschew the use of this term for the morbid conditions produced experimentally in such animals, *e.g.*, to avoid speaking of "beri-beri in swine" till there is more evidence of its identity with the human disease?—ED.

As regards the possible nature of the active agents of deficiency diseases the author considers as the most promising line of attack the theory that "the several diseases are caused by toxic substances, in some cases present preformed in food stuffs, but invariably elaborated in the body as by-products of metabolic processes," and brings facts in support, especially what is known about the production of beriberi-like conditions in swine.

A. G. B.

Gabbi (Umberto). **Infezione emorragica epidemica scorbutiforme o scorbuto?** [Epidemic Haemorrhagic Scorbutiform Infection or Scurvy.]—*Malaria e Malat. d. Paesi Caldi.* 1916. Sept.-Dec. Vol. 7. No. 5–6. pp. 314–316.

The author draws attention to a form of disease presenting analogies with scurvy, which he first observed among the Austrian prisoners confined in the island of Asinara. Later in the year he came upon cases of the same kind among Italian soldiers who had been serving at high altitudes on the Austrian frontier (Cordevale). The disease commences with gastro-intestinal disturbances and diarrhoea, followed by fever accompanied by pains in the joints of the feet and knees, or wrists. Purpuric patches then appear in the neighbourhood of the affected joints, which are slightly swollen. Bleeding cracks in the skin with tumefaction, and gingival haemorrhages also occur. In some cases the spleen is enlarged, and the liver also to a lesser degree. The heart is unaffected. The appetite remains good, and the mental state is generally normal. None of the usual causes of scurvy were present in these cases, the patients having all been well fed and lodged. The author does not record the condition of the urine, nor the result of any bacteriological examination of the blood, or secretions, but merely wishes to draw attention to the clinical features of this apparently epidemic disease.

J. B. N.

Sheppard (A. L.). **Scurvy in Zhob, Baluchistan.**—*Indian Jl. Med. Res.* 1916. Oct. Vol. 4. No. 2. pp. 340–358.

For two and a half years Captain Sheppard, I.M.S. was Medical Officer in Zhob, an area of some 9,000 square miles in the extreme north of Baluchistan. The country is rocky and barren, and the altitude is from three to eight thousand feet. The population may be divided into indigenous, about half of the Zhob militia, amongst whom scurvy is more or less endemic during the winter; immigrants, including the other half of the militia, severely affected; and sojourners, such as the regular troops, free for the last two years.

Various cereals are grown, wheat being the staple crop. No vegetables are raised as a rule; wild vegetables and fruits are gathered in the summer. Meat is eaten in the summer about once a week; in the winter it is dried and treated with salt and asafoetida. The ordinary ration of the militia consists of atta, augmented by dal, ghee, meat and milk "when obtainable and sufficiently cheap"; potatoes, onions and lime juice are sent out to the posts in the winter. However,

" locally enlisted men will not take such things even if given to them ; green vegetables they regard as food for cattle." It is noted, moreover, that onions and potatoes are four times more expensive than in India.

A table shows the relative scurvy incidence in four years of the various tribes comprising the militia. It is seen that as a rule immigrants were more severely affected than the indigenous people. Whereas the incidence for the whole militia was 23 per mille per annum, the figures for the tribes varied from 121·5 to 11. A table of the monthly incidence shows that of 91 cases 81 occurred in the months January to May, and only 10 in June to December ; the seasonal prevalence thus corresponds exactly with food scarcity. A consideration of the yearly incidence at each of ten outposts shows a severe infection at four, but at each post in a separate year, and in order to ascertain if a parallel state of things existed in the Indian prison and Indian native army the records for the last seven years were consulted ; the results are tabulated. There is not much evidence of annual variations, but

" it is noteworthy, however, that 31 prisons in seven years had an incidence of over 5 per 1,000, that these varied considerably from year to year, and 13 of the 31 prisons appear only once, thus indicating isolated outbreaks.

" Many stations mentioned in Table VI [native army] have small garrisons. Here also, as in the prisons and militia outposts, populations are severely affected one year and not again. Explanations of the scurvy in the reports generally attribute the disease to expensive or deficient vegetables, but if this be the whole reason outbreaks should occur whenever similar conditions obtain in other years ; moreover, we cannot suppose that supplies in such places as Bombay, Belgaum, Baroda, and Neemuch vary greatly year by year."

The etiology of scurvy is next discussed with special reference to the work of Holst and Froelich and the experience obtained in Scott's and Shackleton's Arctic expeditions. Though he does not deny the importance of a " deficient " diet as a factor in the causation of scurvy, the author concludes that there are outbreaks of the disease that are difficult to explain completely in this manner.

He goes on to consider the signs and symptoms of the disease, as observed in 94 cases in hospital ; the average time spent in hospital was 37 days and the mortality among the militia was 4 per cent. Seven per cent. of recruits are passed with enlarged spleens but there is no evidence that this predisposes to scurvy. There is a table of the results of blood examination in 20 cases. Notes of five cases of special interest follow.

The author concludes by stating that he saw many cases among the Indians in France in 1914–15 ; onions, potatoes, fresh meat and lime juice were regularly issued [it is not stated whether these articles were actually eaten] and fresh milk was bought. More recently he has seen cases in Mesopotamia, where " ration deficiencies seem to have been an important factor."

A. G. B.

Boyd (T. Crawford). **Scurvy—A Short Note.**— *Indian Med. Gaz.* 1917. Feb. Vol. 52. No. 2. pp. 41–42.

Captain Crawford Boyd, I.M.S., describes five cases of scurvy which occurred amongst recruits in training, apparently at Dharmsala, a hill

station in the Punjab. One died after 47 days in hospital. The diet received by these men is given and analysed; it appears that it yields 5,470 calories. A short account is then given of recent work on protein constituents of food and accessory substances or vitamines.

It is stated that "one of the most notable features of the cases is the relatively slow progress towards recovery, even when given a liberal diet of fresh food and vegetables, and also the fact that lime juice seemed to have very little beneficial effect *per se*."

A. G. B.

SANTANGELO (B.). **Anemia splenica infantile con linfocitemia a decorso febbrile e ad etiologia ignorata.** [A Case of Infantile Splenic Anaemia, with Lymphocythaemia and Febrile Symptoms, of Unknown Origin.]—*Malaria e Malat. d. Paesi Caldi.* 1916. Oct. 20. Vol. 7. No. 5–6. pp. 292–301.

The author has already recorded fatal cases of illness in children, much resembling kala azar in their course, but giving absolutely negative results to cultural and microscopic tests. He now reports another case of the same kind.

The patient was a female infant, aged 16 months. Had lived since birth in a malarious district near Rome. Family history good. The child was brought up at the breast until nine months old, and then had a mixed diet of milk and farinaceous foods. At three months of age, she began to suffer with irregular fever, beginning in the morning with rigors and cyanosis and terminating at 5 or 6 p.m. with abundant sweating. At the end of 2½ months the fever assumed a more recurrent form, lasting continuously for four to five days and then being followed by an apyretic interval of six to seven days. The child, as a result, lost flesh and became anaemic. The treatment employed consisted of the administration of quinine and arseno-ferruginous tonics. Upon examination the child was noted to be somnolent and listless. The skin was yellow and anaemic, and almost devoid of fat, the dentition normal, and the tongue furred and pale. The glands of the neck, groins and axilla were enlarged, but moveable and not painful. No signs of rickets. Heart and lungs normal. The abdomen was enlarged and frog-like in form, with a venous net-work apparent in the hypochondriac and epigastric regions, and measured 44 centimetres round at the level of the umbilicus. The liver and spleen were both notably enlarged, smooth and not tender to pressure. Wassermann and von Pirquet reactions in both parents and child were negative. Urine normal. In the stools neither parasites nor ova were found. A spleen-puncture showed no parasites of any kind, and serum tests and cultures of every kind were completely negative. The child was only kept in hospital for six days, being then removed by its parents, and it died soon afterwards, no autopsy being obtained.

Several examinations of the child's blood gave an average count of 2,339,000 red cells per cmm. with haemoglobin 45 per cent. of the normal; the leucocytes were 49,675 per cmm. or 1 to 47 reds. The percentage of lymphocytes, large and small, was 72, mononuclears 1 per cent., polynuclears 21, and eosinophiles 0·4, transitional forms 1·8 and myelocytes 2 per cent.

The author proceeds to discuss these data, and comes to the conclusion that there is a form of chronic splenomegaly in children, with anaemia and lymphocythaemia, not hitherto classified, which, though rare, is of a distinct type. A bibliography of papers bearing on the subject is appended, mostly Italian.

J. B. N.

WENDER (Louis). **The Role of Syphilis in the Insane Negro.**—*New York Med. Jl.* 1916. Dec. 30. Vol. 104. No. 27. Whole No. 1987. pp. 1286–1292.

The author is Assistant Physician to the Government Hospital for the Insane, Washington, D.C. The material utilised for his paper consists of 106 coloured male patients admitted in 12 months, 1914–15; all but 20 were residents of the District of Columbia. Of these 106 fifty-three were shown by a Wassermann to be infected with syphilis; there were 21 in whom the relationship between the existing psychosis and syphilis could not be clearly established, and 32 who suffered from cerebro-spinal syphilis (11) or general paralysis (21). These figures, compared with those of other investigators, are stated to be high, especially when it is considered that "the Washington negro belongs to a higher social stratum than the average negro." Details are given of the Wassermann tests. In some cases the blood had to be examined several times to clear up the diagnosis. In one unquestioned case a positive reaction was not obtained till salvarsan was given. Twenty-six cases had nephritis. The author writes:—

"Stengel and Austin,* in speaking of syphilitic nephritis, mention a chronic form in which syphilis is the etiological factor. It is in the later stages of syphilis that amyloid and interstitial kidneys are common. These authors believe that there exists a parenchymatous type of nephritis due to syphilis, characterized by albumin, hyaline and granular casts, with occasional tendency to produce edema of renal distribution. Out of eighty-four cases of nephritis they found sixty-six with syphilis as a possible cause for the disease. Of the eighteen remaining there existed in eight either an unquestionable history of syphilis or a positive Wassermann, or both. In six no Wassermann was secured, while in four syphilis was definitely excluded."

The author's cases bear out these statements [see also MCNEIL, this *Bulletin*, Vol. 9, p. 96]. The paper goes on to a description of the symptoms, diagnosis, prognosis and treatment of the cerebral syphilis and paretic groups respectively, some cases being discussed in detail, and ends with the following conclusions:—

"1. Our findings seem to justify the conclusion that syphilis is prevalent to a marked degree in the coloured race. . . .

"2. The occupations of waiter, barber, and cook, in which the negro is so widely engaged, offer many opportunities for the transmission of this disease by routes other than the sexual, and a demand on the part of the general public that employees in this field have a physician's certificate that they are free from syphilis, would undoubtedly tend to limit the spread of this disease.

"3. Syphilis should be suspected in cases of nephritis where no other definite cause can be found, especially in middle aged people.

"4. A negative blood Wassermann does not exclude syphilis, and suspected cases should have a provocative test. Spinal fluid examination should be made in all cases of suspected syphilis of the central nervous system. Moreover, this procedure is justified even in cases of general syphilis, especially in the secondary stage, with the hope of recognising central nervous involvement in its earliest stages."

A. G. B.

* Syphilitic Nephritis, *American Journal of Medical Sciences*, 1915. Vol. 149.

Boyé (G.) & Clarac (G.). **La pneumococcie chez les tirailleurs de l'Afrique occidentale. Observations cliniques et thérapeutiques.**—*Paris Méd.* 1916. Dec. 30. Year. 6. No. 53. pp. 568–571.

The authors have treated in France 387 bacteriologically confirmed cases of pneumococcus infection in natives of West Africa—pneumonia 164, broncho-pneumonia 129, pulmonary congestion 94—all young robust subjects. The death-rate was 8·12 per cent. In similar Frenchmen the mortality would have been nil. The authors discuss the reasons of this and come to the following conclusions:—(1) Natives of Tropical Africa are specially receptive to the pneumococcus. It does not appear particularly virulent in them. The large number of cases observed is to be attributed to simultaneous incubation rather than infection from man to man. (2) The resistance offered by these natives to the pneumococcus is generally lessened by reason of cardiovascular instability, which frequently takes the form of cardiovascular weakness. In all the patients there was a striking lowness of arterial pressure prolonged even into convalescence. The fatal issue in almost every case was attributable to or precipitated by this vascular weakness, which is also a cause of the sudden death that is so frequent in pneumonia in natives. (3) This weakness is attributed to the abuse of kola nut, the sudden suppression of which may produce serious symptoms, especially in the presence of an attack of disease. (4) Consequently, it is advisable to give kola nut not only to the patients but to healthy natives, especially when increased activity is demanded of them. The authors add that it is not a panacea and that the drugs found universally useful in pneumonia must be employed as well.

They refer to a paper by Carnot and Kerdrel [this *Bulletin*, Vol. 8, p. 390], saying that in their own cases there was no evidence of the increased virulence of the pneumococcus of which these authors speak. There were as a rule no signs of gravity and it was difficult to keep the patients in bed. It is noted that pneumococcus infection is severe even in Africa amongst natives of Senegal and the Soudan; Le Dantec writes that it resembles the form seen in Europe in drunkards and old men. As to the arterial pressure, a study of seven healthy natives placed this at 14–10 and a similar result was obtained in 16 surgical patients and 16 dysenterics. The corresponding pressures of the pneumonia patients were almost always below 12·8. The Riva-Rocci method was used. Brief details of six cases are given in which the administration of kola produced a marked rise of pressure; each patient has two to three nuts a day.

A. G. B.

Rudler. **Enquête sur l'alcoolisme dans la population scolaire indigène de l'Algérie.**—*Bull. Soc. Path. Exot.* 1916. Dec. Vol. 9. No. 10. pp. 773–777.

Dr. Rudler in 1910 began to study alcoholism in Algeria and drew up a questionnaire which was sent to all the schoolmasters. He died in the same year. The replies were however collected and sent to Dr. Edmond Sergent, to whom we are indebted for the paper published

under Rudler's name. The questionnaire is given. The native population of Algeria consists of Jews and Mussulmans; this enquiry relates only to the latter. The Mussulmans are of both Berber and Arab race. In the south exists a race of doubtful origin, the Mozabites or people inhabiting the Mzab, and a negroid race, the Harratin, settled in the oases. Discussion of the replies is classed under country, large towns, and Southern Territories (oasis). In the former the danger of alcoholism is stated to be insignificant (country) or developing in workshops where both natives and Europeans are found (towns). In the South alcoholism is "making terrible progress amongst the settlers of the Saharan oases, where even the children are tainted." These peoples drink absinthe, anisette, and mahia (date spirit). Amongst the Mzab almost all the Jewish households have their own still. At Ghardaia cases of acute alcoholism are fairly common among adolescents; they invariably get drunk on occasions and fête days. The schoolmasters express the opinion that if the Koranic law is not sufficient to keep the Mussulman from alcoholism instruction in schools will be useless. Many urge absolute suppression of the sale of fermented drinks, especially absinthe and anisette, and that the interdiction of that of kief and hashish be better enforced.

A. G. B.

Indian Journal of Medical Research. 1916. Apr. Vol. 3. No. 4. pp. 742–762.—**Pyorrhoea alveolaris and Associated Conditions among Indians and Europeans.** A Report received from the Kitchener Indian Hospital, Brighton.

This was a statistical enquiry* instituted with the object of obtaining a standard of comparison for the future, and to shed light upon "the degree of ineffectiveness produced in a soldier population by the presence of mouth defects traceable to, or said to be a consequence of, pyorrhoea." It was decided at the outset that the enquiry should not be bacteriological. It is pointed out that the Indian soldier is a selected person, "in particular as regards soundness of his teeth." Pyorrhoea needs defining. It was taken by the authors to connote "a gingivitis with recession or hypertrophy of gums, pocketing between gums and teeth, with or without the actual presence of pus." The subject is divided into:—(1) General conditions associated with pyorrhoea and dental caries, which may be related to them either as cause or consequence; (2) local conditions; (3) comparison of degree of these affections in (*a*) Indians and Europeans, (*b*) different classes of Indians. The findings are given in 36 tables.

The available material consisted of 185 sepoys, the majority of whom (136) suffered from gun shot wounds; 76, or 41 per cent. had pyorrhoea, in the sense defined. Forty bhistis, 31 sweepers, and 66 European ward orderlies were also used; these were not patients but personnel. Special attention is drawn to the comparison between Indians and Europeans as regards caries.

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*Conducted by Majors S. P. James, W. S. Willmore, W. F. Harvey, T. H. Gloster, all of the I. M. S. and Mr H. L. Dorell, Dental Surgeon to the Hospital.

The summary given is as follows :—

" 1. Pyorrhoea and caries show steady increase with increase of age.

" 2. Some association is shown between pyorrhoea and rheumatism. The influence of age has to be taken into account.

" 3. There is little evidence from our figures of a connexion between such constitutional states as gastrointestinal disturbance or anaemia and caries or pyorrhoea.

" 4. None of the associations involving local conditions, such as mouth acidity and caries, pyorrhoea and caries, tartar accumulation and caries, chewing or smoking and preservation of teeth, cleansing and preservation, diet and pyorrhoea or caries—showed as high a degree of association as might have been expected from current ideas on the subject. The peculiar character of the population under examination has to be taken into account before we lay too much stress on these findings. The method of investigation adopted by us is, however, one which we feel we can heartily commend as being likely to lead to chastening of previous impressions.

" 5. The institution of comparisons between Indians and Europeans of the class we examined, leaves us in no doubt about the greater preservation of teeth in the former."

A. G. B.

## Book Review.

Ruiz-Arnau (R.). **La Lymphectasie Tropicale Primitive.**—138 pp. 1916. Paris: A. Maloine et Fils, Editeurs, 27, Rue de l'Ecole-de-Médicine.

In this interesting work the author deals with the different affections of the lymphatic system, so often met with in tropical climates, and attempts to prove that some are not necessarily filarial, but are due to climatic causes per se. Such opinions have been brought forward before, and have advocates even at the present day, but now opinion leans more and more to a specific cause for all tropical maladies, with climate influencing the results in various ways. The study of the different manifestations of filariasis is by no means an easy one, many of the pathological changes involved being imperfectly understood and not yet thoroughly worked out. Recent researches have however proved that conditions such as simple hydrocele and simple inguinal and femoral adenitis are in many instances really due to filariasis, Wise's discovery of calcified adults allowing one to state definitely that the parasites have been there and by their presence have produced the pathological entity. Remembering these facts therefore one may approach the contents of the present work. The author presents in tabular form the number of cases which he has observed, these forming the basis of his remarks. As this table is interesting it may be quoted in full :—

| | | |
|---|---|---|
| Endemic lymphangitis of the lower limbs | .. .. | 38 cases. |
| Recurring dermatitis of the feet | .. .. | 66 „ |
| Simple oedema of the legs (non classifiable) | .. .. | 38 „ |
| Oedema of the malleoli ( ditto ) | .. .. | 11 „ |
| Inguinal adenitis ( ditto ) | .. .. | 175 „ |
| Simple hydrocele.. .. .. .. .. | .. | 109 „ |
| Filariasis .. .. .. .. .. .. | .. | 3 „ |
| | | 440 |

This may with advantage be critically analysed later, together with another table comparing the author's primitive *lymphectasie* with filariasis. This is as follows :—

| *Filariasis.* | *Lymphectasie primitive.* |
|---|---|
| Elephantiasis of the legs. | Simple chronic oedema of the legs and malleoli (*lymphectasie primitive reticulaire*). |
| Adeno-lymphocele. | Non-classifiable enlargement of glands (*lymphadenectasie simple*). |
| External genital filariasis. | Frequence of simple recurring lymphangitis of the scrotum. |
| Internal genital filariasis. | Frequence of simple hydrocele. |
| Craw-craw [*Sic*] | Recurring acrodermatitis (*lymphectasie primitive radiculaire*). |
| Elephantiasis of the arms. | Frequency of recurring lymphangitis of the arms. |
| Elephantiasis of the breast. | Dermatitis " iterative " of the nipple and subsequent lymphangitis. |

This table is not convincing, most of the symptoms given under the second heading being really the early manifestations of the former. Why Craw-craw should have figured here is inexplicable. It has probably nothing to do with filariasis, but even if it has, then *Filaria perstans* is the parasite implicated, not *Filaria bancrofti*. This specific instance is a good example of a statement made once and then accepted by writers and others without confirmation. Once such a statement appears in the literature it seems to be perpetuated *ad infinitum*.

As regards the first table, surely no one knowing the West Indian Islands would accept the three cases of filariasis out of the 440 as being the only

ones due to this parasite. The vast majority of the other lesions are almost certainly due to the same cause, and definite proof might have been forthcoming if proper blood examinations had been made.

If one accepts elephantiasis as filarial in origin, one must do the same for the vast majority of endemic lymphangitis cases (Filarial lymphangitis) as the latter is the precursor of the former in almost every instance and shades insensibly into it.

Where a real difficulty is met with is, that *all* elephantiasis and certainly all hydrocele cases are not filarial, as the former though very rarely, does occur in temperate regions, while the latter of course is common. Now admitting this, one must also admit that such non-filarial cases may equally well appear in filarial districts and it must necessarily be difficult to decide which is which. To get an idea how often this happens one must study tropical regions where filariasis is non-existent or at any rate very rare, and if Dr. Ruiz-Arnau had done this before committing himself to print he would have found that his primitive lymphectasie cases were practically non-existent there or at any rate only occurred in a similar ratio to that met with in temperate regions like England. This is one of the chief reasons why one is so certain that the *F. bancrofti* is the real cause of such lesions. Another lies in the records of post-mortem examinations which, as already stated, prove up to the hilt that cases which were thought clinically during life to be simple hydroceles or simple adenitis, were after all due to the presence of filaria in the tissues of those parts. There is no mention of any post-mortem work in Dr. Ruiz-Arnau's manual, a serious omission when one is trying to propound a new theory of a magnitude such as this. The work is too theoretical throughout and much more proof is required to support the writer's statement on page 101–102 that a particular lymphatic condition latent or manifest exists, specifically derived from the influence of a continued tropical climate. To help himself with the specific action of the tropical factor he calls to his aid sprue, but surely he could not have chosen a worse example, for here again if due to climate why should the disease be limited to parts of the tropics only and not occur generally ?

The same looseness occurs in the chapter on so-called primitive enlargement of lymphatic glands, where the author perpetuates the old error of climatic bubo being plague. The elucidation of the cause of glandular enlargements in the tropics is difficult it is true, but it will certainly not be simplified by arguments such as these. Everything, even here, points to a specific cause. Some buboes are real plague, pestis minor or major ; some are climatic, by that term being meant a disease acquired after sexual intercourse with black women ; some are truly venereal, syphilis, soft sore, or gonorrhoea ; some are filarial ; some are due to trypanosomiasis, and so on, but we still await the demonstration of the proof that any are due to climate *per se*.

Though one cannot agree therefore with the author's theory of tropical climate as a cause of the diseases mentioned, yet one cannot deny that once the real cause is there climatic and other conditions may influence the symptoms present. Attacks of filarial lymphangitis are certainly less common in a cold bracing climate than in the damp tropical heat, but here again, the real explanation may lie in the fact that the secondary bacterial contaminators are less active in the cold than in the heat. (Compare boils and other staphylococcic infections). More researches are required to prove the exact mechanism of the production of many of the filarial manifestations because, though the filaria is the primary cause, organismal and other influences undoubtedly play a part in producing the pathological changes. Dr. Ruiz Arnau's work will therefore do good in bringing this branch of tropical medicine before the profession in a new light and if it stimulates someone to thrash out these problems anew, then it will not have failed in its object.

G. C. Low.